REPORT

FROM

THE COMMISSIONER OF PATENTS,

SHOWING

The operations of the Patent Office during the year 1842.

FEBRUARY 1, 1843.
Read and referred to the Committee on Patents and the Patent Office.
FEBRUARY 3, 1843.
Motion to print, referred to the Committee on Printing.
FEBRUARY 7, 1843.
Ordered to be printed, with a portion of the documents, and that 1,000 additional copies be furnished for the use of the Senate.

PATENT OFFICE, *January*, 1843.

SIR: In compliance with the law of Congress, the Commissioner of Patents has the honor to submit his annual report.

Five hundred and seventeen patents have been issued during the year 1842, including 13 re-issues, 15 additional improvements to former patents, and 2 disclaimers, of which classified and alphabetical lists are annexed, marked A and B.

During the same period, 352 patents have expired, as per list marked C. The applications for patents during the year past, amount to 761, and the number of caveats filed, was 291.

The receipts of the office for 1842, amount to $35,790 96; from which may be deducted $8,086 95 repaid on applications withdrawn, as per statement D.

The ordinary expenses of the Patent Office for the past year, including payments for the library, and for agricultural statistics, have been $23,154 48; leaving a net balance of $5,264 20 to be credited to the patent fund, as per statement marked E.

The above expenditures do not include those incurred within the last year for the recovery of the stolen jewels.

For the restoration of models, records, and drawings, under the act of March 3, 1837, $14,062 02 have been expended, as per statement marked F.

The whole number of patents issued by the United States previous to January 1843, was 12,992. The continuance of the depression of the money market, and the almost universal prostration of all business, operate very disadvantageously on the receipts of this office, as many hundred applications are delayed solely from the want of funds, or difficulty of remittance. The patents granted for the year, however, exceed those of the year previous, by 20, though there have been less applications by 86.

Thomas Allen, print.

The digest of patents continued and brought down to January, 1842, has been printed, and 700 copies distributed to the respective States, and 200 copies deposited in the library, in compliance with the resolution of Congress, directing the same.

The accommodations granted during the last year for the reception of the articles received through the exploring expedition intrusted to the National Institute, must seriously thwart, if not suspend, the design of Congress in the re-organization of the Patent Office, which enacts section 20, act of July 4, 1836, "That it shall be the duty of the commissioner to cause to be classified and arranged, in such rooms and galleries as may be provided for that purpose, in suitable cases, when necessary for their preservation, and in such a manner as shall be conducive to a beneficial and favorable display thereof, the models and specimens of composition, and fabrics, and other manufactures and work of art, patented or unpatented, which have been, or shall hereafter be, deposited in the said office." While the annual receipts of the Patent Office above the expenditures are sufficient to carry out fully the benevolent objects of the National Legislature, the want of room of which it is thus deprived will be for a time an insurmountable obstacle, as all the room in the gallery could be advantageously used by either the Patent Office or the National Institute. No remedy therefore remains but an extension of the building, which might be done by the erection of a wing sufficiently large to accommodate the Patent Office on the first story. The building can also afford room for lectures by professors, should they be appointed under the Smithsonian bequest: and may I be permitted here to observe that a gratuitous course of lectures in the different branches of science would certainly do much to diffuse knowledge among men. I can confidently say, that the agricultural class look forward with bright anticipations to some benefit from the Smithsonian bequest, and to the time when the sons of agriculturists, after years of toil at the plough, can attend a course of lectures at the seat of government, and there learn not only the forms of legislation, but acquire such a knowledge of chymistry and the arts as will enable them to analyze the different soils, and apply agricultural chymistry to the greatest effect. Such encouragement will indeed stimulate them to excel in their profession, while others, deemed by many more favorable, are indulged with a collegiate course of education. Little indeed has been done for husbandry by the General Government, and since 80 per cent. of the population are more or less engaged in this pursuit, the claim on this most beneficent bequest will not, it is hoped, be disregarded. The National Agricultural Society, in connexion with the Institute, will most cheerfully aid Congress in carrying out their designs for the great benefit of national industry.

It is a matter of sincere congratulation that the Patent Office has so far recovered from its great loss in 1836, by the conflagration of the building with all its contents. A continued correspondence with 11,000 patentees, and untiring efforts on the part of all concerned with this bureau, have accomplished much; indeed, to appearance, the models are better than previous to the fire. Although something yet remains to be done, enough has been accomplished to remove the past embarrassment, and afford applicants the means of examination as to the expediency of applying for a patent.

The loss to the library sustained by the fire, is not yet fully repaired, and since the law of 1836 makes it a duty to examine all applications for patents, with reference also to foreign inventions, it is absolutely necessary that the library should be extended. It is true that the library of Congress possesses

some books on scientific subjects useful for reference in the labors of this bureau, but no permission is given to take out books from that library; and, if such liberty were granted, it would be bad economy to send an examiner to the capitol to look up similar cases. If applications are to be examined, it will promote the despatch of public business, protect against spurious patents, and give public satisfaction, if the Patent Office library is well supplied with necessary books. Already hundreds of applicants are satisfied by the comparatively imperfect examinations now made by referring to books on hand, not to take out a patent, and when, in the rejection of cases, reference is made to foreign patents, there is an impatient desire to see the description of the invention that is to cut off the hopes of so many years of toil and labor. I would, therefore, most earnestly recommend an appropriation of $1,200 from the surplus fund, to add to the Patent Office library.

The annual agricultural statistics, comprising the tabular estimate of the crops, for the past year, with accompanying remarks and appendix, will be found subjoined, marked G.

The value of this document to the whole country, from year to year, it is believed, would justify a much larger appropriation from the Patent Office fund for this purpose. The diffusion of such information may save millions to the laborious tiller of the soil, beside adding directly to his means of export many millions more. An examination of this subject, and the expediency of fixing it on a more permanent and advantageous basis by the constitution of an agricultural bureau, or at least an agricultural clerkship, at a moderate expense, to be drawn from the patent fund, is respectfully suggested. The additional benefit which might thus accrue to the population of our widely extended country would soon be seen. A sufficient appropriation to allow a personal examination of the various parts of the country by some one well qualified for such duty, similar to what has been attempted with so much success by some of the State Legislatures, would, it is believed, realize a vast amount of practical good, especially to the south and west, by furnishing the data on which they might direct their products to the best markets for domestic sale or foreign export.

Such, indeed, are the great benefits to result from personal observation and critical examination, not only of the crops but agricultural implements—such the importance of explaining the new improvements, and collecting and distributing all the acclimated seeds which are proved to be so signally productive or beneficial, that the Commissioner of Patents has doubted whether a modification of his duties in connexion with the Patent Office, would not be more useful to the community. During the last year he embraced the opportunity, while travelling, to examine the crops in ten States, and though the examination was of course imperfect, it enabled him the better to digest the somewhat discordant materials from which the agricultural statistics here incorporated were compiled. If millions can be saved to the public, if the agriculturist can be encouraged in his all-important pursuits, by the expenditure of a small sum from the annual surplus of the patent fund, what better destination could be given to this amount? Would not the people heartily approve and earnestly second such an undertaking?

All which is respectfully submitted.

H. L. ELLSWORTH.

The PRESIDENT *of the Senate.*

D.

Statement of receipts for patents, caveats, disclaimers, improvements, and certified copies, in the year 1842.

Amount received for patents, caveats, &c. -	$35,790 96	
Amount received for office fees - -	714 67	
		$36,505 63
Deduct repaid on withdrawals - -	–	8,086 95
		28,418 68

E.

Statement of expenditures and payments made from the patent fund, by H. L. Ellsworth, Commissioner, from the 1*st of January to the* 31*st of December*, 1842, *inclusive, under the act of March* 3, 1839.

For salaries - - - -	16,350 00	
For contingent expenses* - - -	3,687 61	
For library - - - -	105 37	
For temporary clerks - - -	2,830 75	
For agricultural statistics, &c. - -	105 75	
For compensation to the chief justice of the District of Columbia - - -	75 00	
		23,154 48
Leaving a net balance to the credit of the patent fund - - - -	–	5,264 20

* Expenses incurred, recovering jewels, not included.

F.

Statement of expenditures on the restoration of the Patent Office, under the act of March 3, 1837.

For draughtsmen - - - -	$2,400 00	
For examiner and register - - -	1,000 00	
For restoring the records of patents -	174 08	
For restored drawings - - -	103 00	
For restored models and cases for models -	9,763 54	
For freight on models - - -	462 88	
For stationery - - - -	156 52	
		$14,060 02

H. L. ELLSWORTH.

PATENT OFFICE, *January*, 1843.

Table A occurs in our Regular copy of the Report for 1842, which is 27th Cong., 3d Sess., House of Rep. Document no. 109, p. 4-5. (1 Ag84)

Tables B and C, appear in the above copy, pp. 113 - 173.

G—*Tabular estimate of the crops for* 1842.

States, &c.	Population according to the census of 1840.	Present population, estimated on the annual average increase for 10 years.	Number of bushels of wheat.	Number of bushels of barley.	Number of bushels of rye.	Number of bushels of buckwheat.	Number of bushels of Indian corn.	Number of bushels of potatoes.
Maine	501,973	532,102	1,091,090	355,265	165,640	58,467	1,188,728	12,504,308
New Hampshire	284,574	287,646	533,006	123,589	349,520	127,052	220,183	8,218,369
Massachusetts	737,699	774,536	209,547	155,660	563,078	100,928	2,202,113	4,821,308
Rhode Island	108,830	112,319	3,688	67,921	41,860	3,611	542,896	1,105,874
Connecticut	309,978	313,671	104,673	30,988	886,372	367,615	1,827,771	3,304,798
Vermont	291,948	294,884	564,116	54,393	265,363	254,419	1,391,595	10,941,718
New York	2,428,921	2,592,044	11,132,472	2,196,081	3,280,306	2,917,974	13,311,616	36,880,017
New Jersey	373,306	389,050	874,643	12,791	2,201,592	959,543	5,000,105	2,991,933
Pennsylvania	1,724,033	1,836,773	10,887,015	194,805	8,368,661	3,119,831	13,553,360	12,724,180
Delaware	78,085	78,384	333,065	5,019	40,448	14,443	2,381,766	265,780
Maryland	470,019	476,900	2,814,553	3,590	739,187	89,144	5,615,640	1,003,679
Virginia	1,239,797	1,248,314	7,502,383	98,914	1,186,449	326,961	38,101,657	3,468,709
North Carolina	753,419	758,048	1,747,334	4,000	231,197	20,322	25,332,194	3,758,618
South Carolina	594,398	798,361	1,059,885	3,870	53,990	.....	16,492,216	3,257,195
Georgia	691,392	829,058	2,203,737	12,728	70,635	550	24,072,043	1,974,282
Alabama	590,756	675,116	933,248	7,942	62,220	66	26,345,105	2,208,406
Mississippi	375,651	477,360	346,275	1,822	13,590	83	7,693,771	2,106,244
Louisiana	352,411	393,745	.....	.....	2,109	.....	7,857,362	1,057,824
Tennessee	829,210	873,400	5,915,033	4,964	356,229	21,141	55,742,384	2,431,078
Kentucky	779,828	807,401	5,131,114	16,045	1,987,236	10,961	49,053,849	1,538,851
Ohio	1,519,467	1,711,935	25,387,439	229,282	994,085	741,230	39,424,221	7,277,309
Indiana	685,866	788,415	8,500,666	31,602	210,268	63,175	38,838,275	2,233,761
Illinois	476,183	638,784	5,799,038	98,862	130,776	79,326	25,546,728	3,266,693
Missouri	383,102	456,974	1,424,545	11,078	82,854	19,440	25,338,922	1,006,707
Arkansas	97,574	117,728	3,079,077	905	9,280	126	7,816,255	456,633
Michigan	212,267	266,363	3,952,389	152,933	53,946	160,781	3,703,589	3,816,985
Florida Territory	54,477	60,399	660	50	348	.....	769,420	327,909
Wisconsin Territory	30,945	43,322	434,409	14,840	2,952	16,364	630,904	573,071
Iowa Territory	43,112	60,456	341,801	1,368	5,889	9,525	1,788,580	315,134
District of Columbia	43,712	48,611	10,629	315	5,269	331	45,998	45,997
Total	17,069,453	18,742,109	102,317,340	3,871,622	22,762,952	9,483,409	441,829,246	135,883,381

G—Continued.

States, &c.	Number of tons of hay.	Number of tons of flax and hemp.	Number of pounds of tobacco gathered.	Number of pounds of cotton.	Number of pounds of rice.	Number of pounds of silk cocoons.	Number of pounds of sugar.	Number of gallons of wine.	Number of bushels of oats.
Maine	788,129	4,210	82	.....	.....	582	291,268	2,237	1,236,964
New Hampshire	455,271	29,102	290	.....	.....	765	203,635	97	1,542,653
Massachusetts	683,011	914	97,297	.....	.....	24,818	548,833	196	1,603,014
Rhode Island	66,548	102	499	.....	.....	819	60	740	207,983
Connecticut	522,451	4,702	630,275	.....	.....	117,086	61,952	1,824	1,575,715
Vermont	880,379	32⅓	781	.....	.....	6,256	6,147,211	104	2,863,648
New York	3,835,300	1,665	1,086	.....	.....	4,296	13,353,109	4,960	24,882,671
New Jersey	443,221	2,422	2,958	.....	.....	3,592	79	8,895	4,319,103
Pennsylvania	2,316,009	3,298	480,374	.....	.....	21,707	3.487,025	17,742	24,120,363
Delaware	25,297	59	401	.....	.....	3,260	.....	288	1,077,988
Maryland	96,173	557½	21,199,696	6,037	.....	6,180	47,910	7,458	3,112,928
Virginia	422,924	28,768	59,627,369	2,643,529	3,239	5,877	1,869,439	13,704	14,264,539
North Carolina	128,346	12,314	16,129,474	41,339,557	3,491,667	6,125	10,712	33,892	4,409,247
South Carolina	28,362	.....	55,654	54,859,979	70,265,554	5,033	37,776	640	1,581,323
Georgia	19,376	14	141,523	152,260,770	14,535,309	5,478	431,530	8,787	1,724,779
Alabama	18,423	7½	264,018	99,279,317	167,421	5,245	12,993	341	1,827,408
Mississippi	784	23⅓	145,212	161,127,267	934,955	190	155	17	826,243
Louisiana	29,717	.....	118,146	125,157,528	4,000,506	935	98,101,793	2,302	121,715
Tennessee	39,876	4,112	28,289,171	27,221,826	9,063	7,182	304,300	689	8,235,816
Kentucky	108,672	11,056	45,494,083	639,408	17,773	4,265	1,553,846	1,820	8,550,760
Ohio	1,237,712	11,136	5,264,766	.....	.....	7,924	7,906,162	12,275	19,381,035
Indiana	1,359,269	10,658	2,660,408	168	.....	628	4,383,885	10,964	8,059,424
Illinois	236,611	2,549	984,960	214,007	718	2,907	473,981	744	8,639,231
Missouri	64,907	27,421	12,727,350	149,889	.....	190	371,200	32	3,127,810
Arkansas	791	1,766	212,266	10,868,366	6,547	196	2,455	.....	294,801
Michigan	169,829	1,143	2,725	.....	.....	1,192	2,294,084	.....	3,822.281
Florida Territory	1,575	3	86,877	7,565,583	574,728	417	298,589	.....	14,346
Wisconsin Territory	49,843	3¾	362	.....	.....	27	171,465	.....	666,599
Iowa Territory	23,028	531	11,153	.....	.....	.....	59,152	.....	379,885
District of Columbia	1,521	.....	65,654	.....	.....	962	.....	.....	13,329
Total	14,053,355	158,569¾	194,694,891	683,333,231	94,007,484	244,124	142,445,199	130,748	150,883,617

AGRICULTURAL STATISTICS.

REMARKS, &c., ON THE TABULAR ESTIMATE.

The tabular view now given, presents, in a condensed form, the results of the various crops during the past year. To prepare it has been no easy task. The sources of information principally relied on, have been the different agricultural papers or journals, reports of agricultural societies, addresses, an extensive correspondence, with personal application to many thoughout the whole country. To those who have thus contributed to our means of knowledge, the public are under no light obligations for the promptness and efficiency with which they have replied to the questions for information; and this success makes the regret the greater, that an answer could not be obtained in every case, so as to incorporate yet further knowledge, so acquired, in this statistical report.

The progress of each crop, however, from its seedtime to its harvest, has been carefully noted, and the various causes which might affect its increase or decrease taken into consideration. The aim has been, as far as possible, to exclude from the elements of which the estimate was to be compounded, everything which could not lay claim to reliable accuracy.

Still it is evident, that, in the present dearth of means in our country for extensive statistical investigation of the kind most necessary, an approximation to the truth is the most that can be attained. This is all that has been attempted; and it is hoped that as close and accurate a view as the means at command, and time for the purpose, would allow, is thus furnished. It will be recollected, that the estimate must be finally settled after the crops have been gathered in, the latest of which reach to the month of December; so that the preparation of the whole must chiefly be comprised in the compass of less than two months.

It is often, too, not a little difficult to reconcile conflicting statements and calculations, either of which, so far as it appears, are entitled to equal credit with the others, and yet which give no clew as to the basis on which they are formed, and by the careful examination of which they could be verified or disproved. Great vagueness, likewise, exists in the slight notices found in many of the agricultural journals, where something like a record of the crops from month to month usually forms a part of their columns. An effort has been made to sift out the truth, and so to weigh the evidence, and compare the various results, as to give at least a bird's eye view of the whole. If any one should question the correctness, or if subsequent sources of information should show that we have been mistaken, no one, we are certain, can impute it either to want of diligence in collecting, or to the sparing of any effort to discriminate and to ascertain the truth.

PROGRESS OF IMPROVEMENT.

The progress of improvement in agriculture, though gradual, is yet steady. The importance of this branch of industry is beginning to be more and more appreciated. The whole country is more or less interested in it; as it

furnishes beside what is consumed at home, at least three fourths of all the exports of the United States. The vast public domain of unsold lands, too, will be affected by this progress, and its value proportionably enhanced. It may be well here to mention some of the principal sources of this improvement.

CAUSES OF IMPROVEMENT.

The geological surveys ordered, and in progress, or recently completed in many of the States, beside the other important benefits thereby conferred on those States, have contributed much to advance the science of husbandry. These, in connexion with the experiments of agricultural chymistry, by thus directing the attention to their analysis, are developing the nature of the soils, and their adaptation and means of increased production by different seeds, products, and methods of cultivation and manures, and so enable the farmer or planter to use the varieties of his land to the best advantage.

The increasing number of agricultural periodicals and treatises, and their cheaper and more extensive circulation throughout the land, are also producing a happy effect. The farmers and planters in the various sections of our country are thus brought acquainted with each other's operations and success, and also with the methods of cultivation and rearing of stock, &c., common in England and on the continent; new products, and the result of their trial, are noticed, and the knowledge of many useful discoveries thus extended. The prejudice against "book farming," as it has been termed, which has so long proved a barrier to the adoption of valuable improvements thus suggested, is gradually wearing away; and a happy combination of science and practical skill is thus secured, the results of which are every year becoming more and more apparent.

Agricultural societies also exercise great influence in furthering the progress of agricultural industry. These are of but comparatively recent date, and their institution and increase in number and prosperity serve to mark the progress of improvement in agriculture; and if still further aided by an efficient board of agriculture, like what exists in Great Britain, they would no doubt be yet more successful. It is only about fifty years since that board was there established, and it has proved of extensive benefit to that active empire. By means of these societies, great numbers of the agriculturists of our country are brought together, to compare notes as it were, to observe each other's success, and to converse on the topics connected with this branch of industry; they examine the machines, implements, animals, and products, offered for exhibition, and are induced to bestow more care and labor in the selection of their seeds and stock, in the preparation of the soil, and in their tillage and harvesting. Every year new and valuable improvements are thus made known and introduced, by which many are essentially benefited. Premiums also encourage to effort; and a highly salutary incentive is furnished in the honor to be acquired of successful and approved farming. A similar effect too, results from the bounties given by the different States, to encourage the culture of some particular product. These have never been offered without a new impulse being stirred, and leading to increased attention to the pursuit. Some of the States, in these respects, are far in advance of others; but almost all are beginning more to appreciate their true interests, and seeking to extend their true prosperity.

While adverting to the causes of general improvement in the agriculture of our country, it may not also be improper to allude to the increased hab-

its of temperance and sobriety of the labor, by which the condition of the farm-house and farm is so essentially benefited, and domestic happiness and effective strength promoted. A clear head and a vigorous frame, in combination, will ever be most successful in tillage, as in every branch of industry. The lengthening of life and the repair of health thus secured, render many who have been but drones and mere consumers, also active and efficient producers as well as healthful consumers. The amount added, too, in the increased skill, as well as the saving, from less breakage of tools and machinery of labor, and the actual effectiveness of such laborers, as have heretofore been drawn from the intemperate class now reformed, constitute no small item of gain in this view of the subject. No little damage has been thus sustained in the "inebriate" management and cultivation of the land, which is now avoided. Were this the proper place, some most interesting deductions might be made, as to the physical force and efficiency thus added to the various branches of industry, and the bearing of the whole on agriculture, as a source of national wealth.

ELEMENTS OF THE ESTIMATE.

The great and general elements which must be taken into consideration in forming this annual estimate, are, and this is also a stated or permanent cause:

1. The *annual increase of our population*, natually, and also from immigration, and hence, consequently, of our laboring force. While it has usually been computed, that the proportion of the whole population engaged in agriculture, or depending on it for a livelihood, is equal to at least 83 per cent., the last census shows that over 3,700,000, or more than one-fifth of the whole, constitute the effective force of male laborers. This is nearly three times more than are employed in manufactures, and trade, commerce, and navigation, taken together. In Great Britain the proportion is also large: 9,000,000 are said to be engaged in agriculture, to 4,000,000 employed in manufactures. A per-centage, therefore, equal to one fifth of the annual per-centage of the increase of our population, must be allowed on most if not all of the crops, in forming the agricultural statistics, as one of the usual natural elements of which the estimate is to be compounded.

2. The quantity of *new land* now first rendered productive. This applies with much force to several of the later States. The attention of the settler is at first turned to the clearing up, fencing, and putting in order his grounds; and thus, three or four years may often elapse before his land is made to reward his toil in large and full crops. Such a cause has been assigned the past year for the greatly-increased production of the wheat crop in Michigan. The same cause will, probably, prove, to a limited extent, a stated one for some years to come. Similar to this, too, is the restoration of lands, either wholly or partially worn out from excessive cultivation, by enriching them by suitable manures. Considerable attention, and with good success, has been directed to this object for the last two or three years in the older States. Thus, many acres of land in Virginia have been recovered by marling.

The opening, too, of new means of communication, railroads, canals, &c., bringing the markets nearer, has induced large appropriations of land to particular crops, nor has the expectation of the revival of the manufactures

and business generally, by means of the encouragement of a home policy, been without very marked effect.

3. Yet another element of calculation, deserving notice, is what may be called, perhaps, accidental or occasional—such as the failure of some particular crop the previous year, and the endeavor to supply the deficiency by planting more seed, and increased attention the next year. So the failure of an ealier crop, if known in time, may lead to the attempt to produce the larger growth of a succeeding one. It sometimes also happens, that, owing to some cause affecting the growth the previous year, the seed within reach is not so productive as usual. The drain likewise on the stock that may be on hand, by a lively market, may operate in a similar manner. Some of these causes, just mentioned, have not, it is true, operated very extensively the past year, as the crop of the previous year was a good one; and there has been no greatly-increased demand in the market for the different products; yet, in forming our estimate, it seems no more than proper to keep them ever in view. The relative proportion of the various kinds of products used, has considerable influence in determining their amount and home consumption, as more is required of some products to furnish the same nutriment than of others. Of two articles, either of which can be used to advantage at home, the producer will usually dispose of that one which will command the highest price in the market; though this may, perhaps, force him to look for his own supply, for home consumption, to the inferior articles.

The diversion of laborers from, or to other kinds of industry, in consequence of the suspension or revival of the same, also deserves attention. Changes of this description often have a very perceivable effect in regard to some particular results, as well as the general aggregate of production.

4. The operation of striking peculiarities of the season, the increase or decrease of the insect tribes that are hostile to various crops, may very properly be ranked under this class of accidental causes. Our country, indeed, is so extensive and ranging through so many different temperatures, that this variation of the growing season must be expected. Yet, while this necessity exists, on the one hand, we seldom find, on the other, that the cold, or drought, or rainy weather, or the ravages of insects so hurtful to different products, is universal. Some portion at least is more favored than another, and thus the similar crop escapes the injury which lessens the amount of production elsewhere; and hence we seem most effectually secured against any of those alarming failures of entire crops which have caused so great distress in England and other countries, as well as are ready to take advantage of any favorable increase of our trade in these products to foreign parts.

5. There is yet another element to be regarded in forming our estimate—that which is found in the superior productiveness of the crops arising from the influence of the weather-improved seeds, implements of husbandry, tillage, and various unmentioned causes combined. Were the improvement on seed simply to be estimated at 10 per cent. only on the crops, it is said, on high authority, that this would amount in value to $20,000,000, or more. A season more than usually favorable at the time, or just after planting, while the crop is in progress, or at the period of harvesting or gathering, will often add vastly to the amount of the productions. The improved culture, selection of seeds, and early attention to the rotation of crops, exhaustion and manures, will no doubt preserve the new States from the results

which have been so fatal to the older ones in impairing their lands, and thus losing their adaptedness to some particular crop.

All of these elements have been kept in view in the preparation of these statistics; and their compounded influence, as far as it might be estimated, has been the rule of judgment, in connexion with the actual statements of the crops in the various parts of the country. It can not be expected that their application should be brought out in detail with reference to every product in the table, though some such reference will be often found in the review of the crops as they will hereafter be mentioned singly. An error sometimes occurs in estimating the product of a particular crop, derived from the amount brought early into market, occasioned by some unusual activity in pressing it forward with the surplus stock of the year previous remaining on hand, as commanding a better sale, and enabling the producer to realize comparatively a better profit. It is unsafe to rely at all times on such data, though they should be suitably regarded. For want of reflection on this cause, persons may often form a very incorrect estimate, and such seems to have been the case, in some degree, during the past year. Interested men may likewise sometimes so contribute to influence the market price, or the demand that unfounded expectations may be excited, which however are nothing more than temporary, and secure no lasting profit. False intelligence is given by some, either with the corrupt purpose of gain, or from sheer ignorance of the facts in the case, and this is caught up and circulated from one part of the Union to the other. Hence the necessity of closely discriminating the actual or the probable from the merely possible results of the numerous influences affecting the great staple products of our country.

The season.—The season, taken as a whole, has been most propitious. Suitable alternations of warm and cold, of wet and dry, have for the most part rendered the weather genial in its influence on the vegetable kingdom. Yet in a country like ours, of such vast extent, reaching through such varieties of clime, it can not be supposed that all parts are equally favored at every season. Portions of the country have suffered during the past year. In the earlier period of the seedtime and germination, frosts and cold in some of the States affected the grain, and prevented its forming so full as would have been the case had the weather been more favorable. The long-continued and heavy rains in the months of July and August, also did great damage to the crops in Maryland, Virginia, and North Carolina, and tobacco, wheat, maize, &c., were much injured in consequence. To some extent, too, the cotton crop suffered from the same cause in parts of Mississippi and South Carolina. Yet in no one instance is there what can be termed the entire failure of the product. Less injury perhaps than usual, has been experienced from blight and the ravages of insects; and the granaries and storehouses throughout the country, almost literally groaning beneath the burden of our harvests, can testify how truly we are lapped in plenty.

REVIEW OF THE CROPS.

A more particular review of the different crops corresponding to that of the last year's report, will furnish a summary of such information as could be gathered, as to the state of agriculture in our country. It is confined to certain products, as these were the ones specified in the late census, on which the estimates were originally based. The same remarks which are made with respect to one product may sometimes apply with equal force to another bearing the same general characteristics; especially, is this true, as regards the

various species of grain, and reference may also be made to the agricultural statistics of last year's report, for some facts relating to particular crops which are now deserving of notice.

Wheat.—The crop of wheat was a large one. More than one third of this product, as will be seen, is raised in the western States. Of course, the causes which have occasioned a decrease in some portions of the Atlantic States have but slightly affected the whole aggregate. In the western States more wheat was sown than in any year before. The probable reason of this was, that it commands a better price, one nearer a recompense of labor, or more immediately than any other product of the soil; and that the Canada market offered greater inducement for exportation than heretofore.

The reports respecting this crop are quite various. In the New England States it has been better than it was the year previous, though, but little comparatively is raised in this section of the country. It bears, however, a very good proportion to the amount of population. In New Hampshire, the gain on the wheat crop has been estimated by a good judge on these subjects as high as 25 per cent.

New York is one of the greatest of the wheat-growing States near the Atlantic coast. In the eastern, river counties, in the northern section, and in the Mohawk valley, the crop is pronounced to be "good," "better than the year before." In the valley of the Mohawk, heretofore, the weevil has proved a destructive enemy; the past year, however, this cause has been less injurious. In the central, southern, and western sections of this State, the wheat crop was comparatively lighter than usual. In the western region, which is the great wheat-growing section, this was not so much owing to winter-killing and insects, although these last appeared, but the causes of the failure assigned, are the want of its *stooling* out properly, and shortness of head, on account of the unusual cold and wet of the months of May and June, while it was in the incipient formation of the germe. When this is the case, no after culture or change of season, however favorable, can remedy the injury. It was, indeed, supposed, and so published, on information derived from those who formed their judgment merely by a cursory examination while passing the fields, that the crop would be a very large one, the most abundant ever known; but when it came to the harvesting, the above-mentioned causes were found to have greatly affected it, so that the deficiency has been estimated, on good authority, equal to from 20 to 25 per cent.

In New Jersey, in quality, it is thought to have been as good as in the previous year, but the quantity is not so great. The vast quantities raised in the western States have a tendency, of course, to lessen the amount sown in the Atlantic ones, as it is impossible for these to enter into competition at the expense of harder tillage and manuring of their land, with the rich and extensive fields beyond the Ohio river.

Pennsylvania is a large wheat growing State, and the information respecting the crop here is varied. The fly, rust, smut, and wet weather, are assigned as causes of a decrease, probably, equal to 20 per cent. of the whole crop. Near Philadelphia, in the counties of Chester, Delaware, and Lancaster, the season was favorable to this product, and less so to the propagation of the fly; it is possible, too, that the introduction and acclimation of the Mediterranean wheat in that region has had some influence in baffling those great enemies, the rust and fly. The objections formerly made there by the millers, are now relinquished, and it is found to answer their purposes as well as any other kind of wheat. Magnesia liming has proved very valua-

ble in this section, and much poor land has been greatly improved, and hence a surplus raised. In a part of the region bordering on the Susquehannah river, the rust and smut have very seriously affected the crop; so that it was thought to have been not more than two thirds of an average one. In the western section, especially the southwestern region, a moderate winter is assigned as the cause of increase to this crop, of perhaps, one third, though the wet weather, during a part of the season, also, to some degree, affected it unfavorably.

In Maryland, in the eastern and central counties, the crop was much affected by the blight, and the rains which took place during the harvesting. In its first growth it appeared beautiful, but proved to be a great failure; the fly, too, was destructive in some portions. In the upper counties, however, there appears to have been more than the usual average.

Virginia, which ranks as the third of the great wheat-growing States, called the Atlantic States, has suffered much as regards this crop during the past year. There is much complaint of the rust. It has been thought that the crop east of the great mountain ridge is at least one-third less than the usual one. The long-continued and heavy rains in August destroyed a large portion of the crop on James river, as also in other parts of eastern Virginia, as was the case too in North Carolina, contiguous. The rust likewise materially diminished it in portions of the western region of this State.

The wheat crop of Georgia is described by some as having been "hardly a fair crop," "inferior to that of the preceding year," while others term it, on whole, a "fair" and "average" one. From the information obtained, a judgment is formed of the wheat crop in Alabama, that it was more than the usual average one. In Mississippi there has been quite an increase, and it is judged that there is more now raised than is wanted for their own consumption.

The crops in Tennessee and Kentucky were, according to the different accounts, "good," "an advance on the former years," "20 or 25 per cent. better."

Ohio is the greatest producer of all the wheat-growing States. A much larger quantity than usual was sown in many parts of the State, and the yield has been most abundant. In some parts the increase is estimated even as high as "50 per cent.," in others at "not less than 30," "25," or "20" per cent. In the Scioto valley not so much was produced as was expected, as the filling out became checked by the warm rains not long before it was harvested. A much larger quantity, however, was sown, and there was more raised than ever before. The late sown, too, in particular regions of that great State suffered partially from the rust, and the fly also affected unfavorably portions of the crop; this insect enemy is said to be increasing in Ohio, and threatening that beautiful wheat-growing region, and serious apprehensions are expressed respecting its future ravages, unless some means be early found to check its progress. The subject is one which deserves attention; a suitable reward offered might possibly lead to the discovery of some means for destroying an enemy which has already proved of such injury to the wheat fields of other States. The Governor of Ohio, in his late message, estimates the wheat crop of that State for 1842 at 24,000,000 of bushels. This nearly corresponds with the one in the table formed independently from various sources of information, and based on the consideration of the elements heretofore described. He supposes that

this crop, after deducting sufficient for the home consumption will allow at least 14,000,000 of bushels for exportation.

In Indiana and Illinois both the cut and army worms made their appearance, and the crop was somewhat injured by them; but the aggregate of the crop was large. Here, as in Ohio and some of the other States, an increased quantity of land was devoted to this crop, and the yield was much more than an average one. Indeed, the increase has by some been rated as high as fifty per cent. Some idea of the increase of the trade in wheat here may be formed from the fact that from Chicago there was shipped to Buffalo, in 1840, only 20,000 bushels, while in 1841, in the same period, not less than 200,000 bushels of wheat were shipped. The quantity during the same period last year was doubtless much larger. For the year 1843 it is said that the fall of 1842 one half more seed has been put into the ground than in any previous season in Illinois; so that, if the coming season should prove favorable a still greater crop may be expected.

In Missouri also the wheat crop was slightly affected by the army and cut worms, but it proved to be an unusually large one, not less, according to some estimates, than 25 per cent. better. From Arkansas, too, the accounts are equally favorable, and the growth of the last year has been pronounced by some to have been at least double.

In Michigan, likewise, which is destined to be one of the greatest wheat-growing States, there has been an unusual advance on the preceding years. The quantity which had just been brought under successful cultivation was large—the sudden rise of price about the time of putting in the seed, and the favorable season, are also causes to which the great increase may be attributed. It is thought that there has been at least 50 per cent. more sown, and the yield from 25 to 50 per cent. larger. The surplus is great, and the nearness to the Canadas will no doubt enable many of the enterprising farmers of Michigan to derive a handsome profit from their labor. In the southwestern section of the State portions of the crop were injured by threshing it out in wet or damp weather. The fertile sections of the Territories of Iowa and Wisconsin also, by the increased production of last year, promise much hereafter.

The wheat lands in the west are so rich in the proper qualities, that probably for years no injurious effects of a constant succession of this crop need be apprehended; but in western New York, and perhaps in some of the earlier settled sections of Ohio, there is some danger, and the attention of the people has been called to the subject. Liebig, the distinguished author, speaking of Virginia, says: "Harvests of wheat and tobacco were obtained for a century from one and the same field without the aid of manure; but now whole district are converted into pasture land, which, without manure, produces neither wheat nor tobacco. From every acre of this land there were removed in the space of 100 years, 1,200 lbs. of alkavies in leaves, grain, and straw; it became unfruitful, therefore, because it was deprived of every particle of alkali, which had been reduced to a soluble state, and because that which was rendered soluble again in the space of one year, was not sufficient to satisfy the demands of the plants. It is the greatest possible mistake to suppose that the temporary diminution of the fertility in a soil is owing to the loss of the humus; it is a mere consequence of the exhaustion of the alkalies." This is high authority, though it has been questioned by some writers in the agricultural papers. It is important, therefore, that the wheat lands should be kept up by the use of manures; they

will supply those qualities of the soil which are thus exhausted. For this purpose a rotation of crops also is recommended; as it has been found, and this seems to be the true secret of the benefit of the rotation of crops, that after wheat has been harvested from a field, some other plant will restore the alkali so abstracted, and thus bring back the soil to its pristine fertility. Some products do not so far affect the soil but that by manure they may be kept up on the same field for a long time; some also improve the soil; others only impoverish it, while by others still it is supposed to be entirely exhausted. To this latter class among others belongs wheat. Saltpetre and nitrate of potash are mentioned in the late work of Professor Johnston on agricultural chymistry, as most valuable manures for wheat; and he proposes various modes to ascertain which of these two is the better adapted to the purpose. With regard to wheat also, it may be observed on the authority of the celebrated Sprengel, professor of agriculture in Brunswick, that the best grain for bread is not the best grain for seed; that we may increase the nutritious quality by the manure, but for seed this highly nutritious wheat is unsuitable. "Seed corn" (*i. e.* wheat), he says, "must contain the different ingredients in due proportions; if any one of them be deficient or in excess, the plant will be proportionably imperfect. This was the result of careful analysis of a great variety of grain grown on an equal variety of soil. Some soils always produce good seed grain, while others are found which seldom do it. The first are never rich in humus or nitrogen, but well supplied with lime, magnesia, potash, salt, phosphates, and sulphates. Corn or wheat manured with sheep dung contains too much gluten for seed grain, which in germination reacts so powerfully on the starch as to overpress the conversion into sugar (the chief nourishment of the germe), and produce vinegar. The best seed wheat must contain much starch and little gluten; thus the starch is gradually converted into sugar. Hence, seed grain should not be raised on very rich and highly manured soil; for this would derange the natural proportions of gluten and starch, while the grain would be the better for bread. This may be the secret of grain and potatoes deteriorating in highly cultivated districts."

The cause of the rust in wheat and other grain is exciting increased attention, and the doctrine which seems to be now gaining advocates, is that it is owing to an excess of nourishment. Respecting the Hessian fly, Mr. W. H. Hill, in the Nashville Agriculturist, says, that for 15 years his wheat-field did not feel the effect of it, while others did so in his vicinity: he sunned his wheat two days before planting, and besides, chose large full grains by passing it through a sieve. An interesting letter relating to the Mediterranean wheat, and showing that it was unaffected by the fly, may be found in Appendix No. 1.

The entire aggregate of the wheat crop of the United States was 102,317,540 bushels, being an increase of 10 per cent., or 10,674,683 bushels, on last year. The price of wheat has been affected by the quantity raised, and various other causes. Much less has been used for distillation. In the single State of New York there has probably been a decrease from this cause of 3,000,000 bushels, as there has been a falling off of the manufacture of ardent spirits of 10,000,000 gallons. The introduction of threshing machines deserves mention in this connexion. In many places these are driving out of use the flail; persons travel about with them and thresh out the grain for from 3 to 5 cents per bushel, and they will thus thresh large quantities in a single day. The price of horse-power and threshing machines

is now so reduced, that the farmer either singly or by combination, will find his advantage in purchasing the same, thus reducing the expense of their threshing to one half the cost of hiring.

Barley.—There is reason to believe that this crop has made, if any, no material advance the past year. The attention of the public has been so successfully directed to the discontinuance of the malt liquor which possesses an intoxicating quality, that the encouragement offered for its cultivation is becoming less from year to year. Except in New York the amount raised is not large. The information gained as to its yield is also less certain than with regard to most other crops. It forms so small a proportion, that it is often passed over as not deserving the notice in the general record, which, in many cases, is confined to the leading products. It is believed, however, to have been similarly affected with the other grains. The aggregate crop of the past year is estimated at 3,871,622 bushels. This species of grain Loudon considers as next in importance to wheat in Great Britain. In Sweden and Lapland it is more cultivated than any other grain, on account of requiring to be so short a period in the soil; sometimes not longer than six weeks, and seldom more than seven and a half. In Spain and Sicily they have two crops a year on the same soil. The climate in which it delights is warm and dry; and it is said there are instances of its being sown and ripened without having enjoyed a single shower of rain. In parts of Great Britain it is in considerable use as a material for bread, and also for fattening black cattle, hogs, and poultry. As it is a tender plant, and more easily injured than wheat, it is also more expensive of cultivation. In a country like ours, where wheat is so abundant, the inducement to raise it is comparatively small.

Oats.—This is a larger crop than all the other cereal grains, as it is also the hardiest of them, except maize or Indian corn. It is one which, to some extent, is affected by the season similarly with that of wheat; though coming into harvest later, it may not suffer to the same extent from the rains of August. The past year has been more favorable to oats than was the year previous. It will be recollected that the crop of 1841 was estimated as under an average one; in 1842, it is thought to have been above an average one. In the New England States, where it ranks higher in amount than any other grain, it was a good crop. In New York, which produces the greatest amount, it was unusually large; a greater quantity was sown, and the yield per acre was estimated at twenty-five, thirty, or even fifty per cent. better than the year previous. The late sowed in some cases were injured by the rains of September; but even with this deduction, the crop was probably the greatest ever known. In New Jersey, Pennsylvania, and Maryland, it is described as having been a good crop. In Virginia it was, for the most part, better than an average one; in some sections of the State thirty per cent. more; in some others it was destroyed by the forty days' rain of the summer. In North Carolina, Georgia, and Kentucky, the crop was "good," an "increased" one, "very fine," twenty or twenty-five per cent. better than in 1841. In Tennessee, Louisiana, and Ohio, with some exceptions, the crop of oats has been estimated by judges at an advance on the year 1841. The same was the case with Indiana, Illinois, and Michigan, and Missouri, Wisconsin, and Iowa. Arkansas and Louisiana raise but comparatively a small amount. The whole aggregate of this crop the past year, is estimated at 150,883,617 bushels.

Rye.—Pennsylvania is the greatest producer of this crop, and from various sections of the State the report is that it has proved "a good one," "an av-

erage" one, "a full crop," "twenty per cent. better," "one third in advance" of the last years. In New York, too, which ranks next in the amount raised, it seems to have been unusually large—"twenty per cent. more" in some parts of the State than years past. In the New England States, also, the crop was a good one. In Virginia it was subject to the same vicissitudes as the wheat crop. In Kentucky, where considerable quantities are raised, it was better than last year. The same was likewise the case with Ohio. The entire aggregate of this crop amounts to 22,762,952 bushels.

Buckwheat.—Nearly two thirds of this crop is raised in the three States of New York, Pennsylvania, and New Jersey. In New York the increase is thought to have been from twenty to thirty per cent. In New Jersey, though it suffered somewhat from the frost, yet it was, on the whole, a good crop. In Pennsylvania it is described as having been in different parts "not so good as in 1841," "an ordinary, a full crop," or "one third in advance of former years." In South Carolina, Georgia, Alabama, Mississippi, Louisiana, and Arkansas, scarcely any is raised. In Ohio it bore about the same per centage as the other crops. The entire crop is estimated at $9,483,409 bushels. McCulloch says that about 10,000 quarters, or 80,000 bushels, are annually imported into Great Britain.

Maize, or Indian Corn.—With slight exceptions, this favorite crop seems to have been a large one the past year. Nearly every State in the Union reports a considerable gain. The notices, however, are modified now and then by allusions to unfavorable seasons, and causes injurious to its growth.

In New England it was larger than in the previous years. In Maine it is described as "good," "fifteen" and even "thirty-three" per cent. higher. In New Hampshire, "fine, matured, without frost," "ten per cent.," "twenty-five per cent.," and by some even as "a double crop," and the increase is attributed to the season, as respects the rain, &c., while in other portions of the State the early dry and cold season is said to have nearly ruined many fields, so that it was at least from twenty to fifty per cent. worse. In the other New England States the report, on the whole, is favorable.

In New York, in the river counties, and in the southern and northern section for the most part, it was good, perhaps fifteen per cent. better than in the year previous. In the Mohawk valley the first crop is pronounced to have been fifteen per cent. better, but the second one (replanting) ten or fifteen per cent. worse. In the western section of the State, owing to the unusually wet and cold weather of May and June, the crop fell off, it is thought, fifty per cent. In New Jersey, also, there seems to have been a perceptible decrease.

In Pennsylvania, with few exceptions, it appears to have been less than average; in some sections one-half or one fifth decrease, much rain in the planting season having injured it. In other parts, however, it is said to have been an increase of at least from twenty to thirty per cent. on former years. The same diversity existed in Maryland. In some parts of the State the crop was an increased one, or better than in 1841. In the early part of the summer this crop suffered most severely on the eastern shore from the army worm, and in the principal corn-growing counties of Somerset and Worcester the crop has proved an entire failure. These counties have heretofore been considerable exporters, furnishing more than any other two counties in the State, and they now have not enough for home consumption. The extent of the loss may be seen from the statement that where 2,000 bushels usually grows the past year there was but 200; only 10 bushels instead of 800, 80

for 1,500, 50 for 600, and 150 for 1,800. The cause is said to have been partly the "warm winter, which failed to kill the hurtful insects, but mainly the result of heavy rains," which, beginning early in June, continued six weeks. To this succeeded the grubworm. The consequence has been great suffering, and made a large section dependant on exportation. In Virginia the corn crop was better than usual, but suffered much by the heavy rains, by which in some sections it was nearly destroyed, and in others it was kept back by the dry weather. But where these causes did not exist to injure it, the yield was above an average one, and has been rated by some as high as thirty per cent. increase; as a whole, however, this would probably be much too large.

In North Carolina, likewise, the crop was much lessened by the great quantity of rain. Indeed, on some parts of the seaboard it was almost entirely destroyed. Nearly one third of the State was visited by successive inundations, which inflicted vast loss on the inhabitants. From exporters they must now become buyers. The city of Charleston, it is said, has usually received not less than 1,000,000 of bushels from this whole region. This has been a serious calamity, and occasioned great distress.

In South Carolina, the crop appears to have been better than in the previous year. The same was the case in Georgia, where it is thought to have exceeded the crop of 1841, which was a remarkable one by from 10 to 20 per cent. In Alabama and Mississippi, it was large and abundant. In Louisiana 25 per cent. better.

In Tennessee and Kentucky, which are the two greatest corn growing States, the crop appears to have been a good one over all these States. It is variously described in different sections, as "a fair crop," "about as in 1841," "very good," "fine," "excellent," "12½ or 25 per cent. better than last year."

Ohio ranks next in the amount produced, and the accounts are more at variance as to the increase or decrease. On the whole, it would appear that in the northern section of the State, though there was much more planted, yet, owing to the extreme cool and wet season, the crop was not as productive as in the previous years. Perhaps it was not more there than one half or one third of the usual one. In the more southern parts of the State, however, it is described as having been "as good," "better" than in the year 1841. The early part of the season here, also, was too wet and cold to afford much promise; but the weather in the season of earing and filling out proving congenial, the crop was much beyond a medium one. It was also good in Indiana and Illinois, both of which are large producers of corn. In Missouri and Arkansas, the increase is variously estimated at from 25 per cent. up even to 50 per cent. In Michigan, owing to the low price of pork, and that some of the other products commanded a better price, comparatively, less was planted than usual; still the crop was a fine one. This crop was also as good, or even better, than usual, it is believed, in Wisconsin and Iowa.

The whole crop of corn in the United States for the past year, is estimated at 441,829,246 bushels.

If the manufacture of sugar from the cornstalk succeeds, as it promises to do, it is probable a larger quantity of corn will be planted in future. Some remarks on that manufacture may be found under the subject of sugar, below.

Potatoes.—It will be recollected, that in several sections during the year

1841, this crop suffered very greatly, and came near a failure. This year's product is much larger than the former, taken as a whole, though in some parts there has been a decrease from the average. Still even in these cases, it is not so remarkable as in the previous year.

Maine is a large producer of this crop, and perhaps more were planted last year than was the case in the year before; but the yield, on the whole, was not greater, though the quality is said to be much superior. In New Hampshire, it is variously estimated at from 10 even up to 50 per cent. increase, in different parts of the State. Vermont ranks very high in proportion to her population as a potato-growing State, and the crop was probably equal, if not superior, to that of the former year. In the other New England States it is described as having been from "10 to 20 per cent. better," or "as good as an average one."

New York stands, however, foremost of all the States in its production of potatoes. The eastern and southern sections seem to have yielded an increased product, and even an abundant one; in the northern it was an ordinary one; in the valley of the Mohawk about the same as usual; in the western it was affected by the unpropitious weather, and fell off, it is thought by some, not less than 50 per cent.

In New Jersey the production was by some considered a fair one, by others to have been 20 per cent. better than in 1841. In Pennsylvania, with slight exceptions, it is described as being "better," "very large," "30 per cent. advance." In the southern central region it is said to have been "not so good by 30 per cent." In Maryland, in the upper part, large quantities were raised, and the yield was a good one. In Virginia, with the exception of sweet potatoes, there are but few raised east of the mountains. In the northeast part of the State it has been estimated as high as 30 or 33 per cent. increase. On the Ohio river, in the western section, the crop was hardly an average one. In North Carolina, South Carolina, and Georgia, where also the sweet potato is raised, the crop was an "increased one," and in some sections, even "abundant." The same remark applies to Alabama, Mississippi and Louisiana. In Kentucky, Tennessee, and Ohio, likewise, it is said to have been "a fair one," "good," "very good," "many more than the year before," "10, 15, 25, or even 33 per cent. better than in 1841." The potato crop was also much better than usual in Indiana, Illinois, and Michigan. In Florida this product, as well as most others, owing to the season, was 25 per cent. better, though on account of the war, the quantity of land tilled has been small. In Wisconsin and Iowa, like as in the case of most of the other crops, a very considerable addition must be made to that of the previous year. The whole number of potatoes raised in the United States during the past year, is estimated at 136,883,386 bushels.

Hay.—Taking the States where this product is principally gathered, it must be pronounced to have been considerably above the average one. In several States, especially at the south and west, very little attention is paid to this crop. In New York, which ranks the highest, the quantity of hay gathered was in advance of the preceding year. In the New England States, with perhaps the exception of Maine, New Hampshire, and Massachusetts also, there was a larger growth. The drought affected it somewhat, and caused it to fall short perhaps ten or twenty per cent. The quality of the crop, also, was injured, even where the quantity was not lessened, as it was less sweet and nutritious. The same remark may likewise be made as to the growth in New Jersey, where the crop was increased. In Pennsylvania

which ranks second in the amount raised, the yield in some parts was abundant, and has been estimated as high as thirty or even seventy-five per cent. better than in 1841: this probably is too large; but from fifteen to twenty, or twenty-five per cent., may be nearer the truth. In the Susquehannah region, however, it is said to have fallen off as greatly. In Maryland, on the whole it might be termed a fair yield. That of Virginia, as a whole, was an average one, though in some parts of the State it was above the usual growth. The early rains aided it in certain sections, as they did likewise in North Carolina. In Kentucky, in certain sections, as on the Cumberland river and in the southern central ones, owing to the drought the hay crop suffered. In other parts, as also in Tennessee, this cause did not exist, and it is pronounced to have been "excellent," "from twenty-five to fifty per cent. better." Ohio, Indiana, Illinois, Michigan, and Missouri, though devoting comparatively little attention to its production, yet seem to be making some advance in the same; and, accordingly, there has been some increase the past year, though doubtless not a very material one. Some damage was experienced from the invasion of the army worm, but not enough to lessen the crop to any great amount. Though reliance is still placed on the prairie hay, yet there is a gradual improvement with respect to the introduction and cultivation of the tame grasses. The low price of grain in New Orleans will no doubt lessen the demand for pressed hay, which has heretofore been a considerable article of export from the States bordering on the Ohio river, and its branches. The whole number of tons of hay raised in the United States, in 1842, is estimated to have been 14,053,355 tons.

Flax and hemp.—These products have been put together in the tabular estimate, as they were so in the report of last year, in consequence of being so found in the Census Statistics, on which the statistics of the report of 1841 were based. Less confidence can perhaps be placed on the estimates of so comparatively small a crop, raised in moderate quantities scattered over a whole State, than with respect to almost any of the other common crops. There has been there only such an attempted alteration of last year's estimate as the general information derived would seem to justify. In two States, however, with respect to *hemp*, we can speak with more certainty—Kentucky and Missouri. It will be recollected that in the two former years, viz. 1840, 1841, the hemp crop was quite deficient, and proved almost a failure. The past year has been much more favorable. The crop of hemp is a large one; and it is variously described as "very fine," "the best ever raised," "twenty-five or fifty per cent. increase on the average one." The attention is still directed, and it would seem with somewhat more success, to the discovery of a process of water-rotting hemp; and it is hoped that the difficulties on this subject may yet be removed. It is stated that, in consequence of the promise last winter of sending out a Government agent to purchase water-rotted hemp for the navy, the farmers of Kentucky and Missouri have water-rotted 700 tons, or more. This, at the price paid by the Government for Russia hemp, is worth $200,000. Many specimens, it is further stated, have been examined, and that it has been pronounced equal to Russia hemp. Were a suitable reward to be offered to stimulate the ingenious, it can hardly be doubted that, by a variety of experiments, some process of preparing it for the use of the navy as well as the Russia hemp, might be found out.

An important discovery respecting the application of waste hemp to the purposes of papermaking, has recently been announced; and if, when it is

sufficiently tested, it proves all that it promises, it will afford an additional inducement to the culture of hemp. A process is said to have been found out by which hemp can be made as white as snow, and that it may be used in manufacturing the finest and whitest paper; and a belief is entertained that hemp waste, which can be furnished at two cents per pound, will, ere long, be sought for by papermakers to supply the place of linen rags.

Hemp is beginning to be raised somewhat more in the northern and eastern States. This is true, especially, of the northern part of the State of New York. At present, however, it is confined to the seed crop, owing to the high price of the seed. It is affirmed to be a mistake to suppose that it must be confined to alluvial lands, as has been shown by the farmers of Saratoga and Washington counties, in the State of New York. We import of hemp, or hempen articles, some years $9,000,000 or $10,000,000 in value. It is worth from $200 and upward per ton. When planted in drills at a suitable distance, as it should be, and properly cultivated, hemp generally produces, it is said, from twenty to forty bushels of seed to the acre; and instances are not rare of its yielding from fifty to sixty. The seed is generally worth from three to six dollars per bushel. When sown for the lint, it should be sown broadcast from two to three bushels of seed to the acre, depending on the quality of the land; and it usually produces from seven hundred to one thousand weight of clean hemp to the acre. Much valuable information respecting the culture and importance of this crop may be found in the files of the Kentucky Farmer for the last few years.

Flax was once an article of considerable export, and now may be again raised profitably for the seed. In the year 1770, the quantity of seed exported amounted to 312,000 bushels. For twenty-two years previous to 1816, the average annual export was about 250,000 bushels. The reason why less attention is paid to the culture of flax now is, that it is so exhausting a crop. By a rotation of crops, however, this difficulty, it is presumed, might be in a great measure avoided. The smooth rich prairies of the west afford an excellent opportunity for raising flax to any extent; and since linseed is an article which bears exportation so well, many thousand acres might be cultivated to advantage, especially as the crop may be either pulled by machinery, or if seed is the only object, it may be cut with like facility. The aggregate amount of flax and hemp, according to the tabular estimate for 1842, was, 158,569 tons.

Tobacco.—This crop, except in comparatively small quantities, is confined to six or eight States. It forms, as is well known, the great staple of Virginia and Maryland, besides being largely raised in Kentucky, Tennessee, and Missouri. The crop for 1841, it may be recollected, was generally considered above the average, and by some as even a large one. That of the year 1842, on the contrary, has proved a failure. The general report is, that it is poor, both in quantity and quality. In Maryland, however, it is said to be better in quality than it was the year previous. Wet and dry weather at different times lessened the average amount. In Virginia, where the usual average is estimated by good authority at 50,000 hogsheads, it is said to be "one of the worst ever gathered," "not more than two thirds of a crop," "light and or a bad quality;" and the wet weather is assigned as the principal cause of the decrease; "the plants were injured in the bud by the rains." In Middle Tennessee, also, the tobacco crop was "not more than two thirds of one;" while in some other parts of the State, it is said to have "doubled to usual crop," or "better in quality, though somewhat less in quantity." The low price of the previous year is said to have induced less

planting, and the growth was not so large. In the western part of the State however, increasing attention is given to this product. There is the same diversity in the accounts as respects Kentucky. In some parts of that State the crop was "not more than two thirds of an average one," "nor so good by ten per cent." In others, it is termed "very fair," "better than usual," "perhaps ten per cent. better." It is said that there are in this State not less than 5,000,000 acres of land, which would admit of the cultivation of this product, and on which it might be raised at the rate of 600 pounds per acre. The crop of tobacco in Ohio and Indiana may be descr bed in language very similar to that used respecting Kentucky. In Missouri it is said to have been an improved one; more was planted, and there was a better yield. Increasing attention, likewise, is paid to the culture of tobacco, and with success, in Illinois, and in some of the New England States. The recent information furnished in the letter of the Secretary of the Treasury, respecting the amount of home consumption and exports of tobacco, with a great variety of other particulars, will enable any one to form a fair conclusion as to its importance and bearing with our trade on foreign countries. It is there stated that the whole amount supplied elsewhere than from the United States, is about 150,000,000 pounds; the amount of possibte consumption of American tobacco is put at not less than 1,000,000,000 pounds: so that were only one half of this quantity actually consumed, it would be four times more than our present export, and increase our means more than $20,000 annually. The quality of the different kinds of tobacco raised in the different parts of the United States, with the different kinds of manufacture and use to which they are particularly adapted, are also pointed out in various discriminating remarks. Nearly one tenth of the whole pnpulation of our country are said to be engaged in the cultivation of this product, two thirds of whom are in the four States of Virginia, Maryland, Kentucky, and Missouri. The whole tobacco crop of 1842, is estimated at 194,694,891 pounds.

Cotton.—This great staple, from all accounts, appears to have yielded a large crop. It is somewhat difficult to reconcile the conflicting statements respecting its growth and prosperity; but after a careful comparison and endeavor to arrive at the truth, the result is as above estimated. The crop for 1841 was considerably below an average one. That of 1842 is much above the former, and by some is thought to have been equal to that of 1839, which was an unusual one. Subsequent information may, perhaps, disprove particular estimates, and some may be misled by the fact, that a larger quantity than usual was brought into market at an early period. It may be well, however, to mention, more in detail, some of the statements which have been gathered respecting its progress. Passing over the lesser amounts, and commencing with North Carolina, the cotton crop is said to have been 20 per cent. better than in 1841, and the cause assigned, is the favorable weather in the early part of the fall, and the season when the frost usually takes. The crop of South Carolina, also, is said to have been as a whole one-third better; the warm and dry weather proving congenial to its growth. In other parts of the State, it is said, that "much of the finest cotton on the low grounds was swept off by the overflow; others injured by the warm and dry weather; the wet weather also injuring that which was open, so that it could not be handled well." In Georgia, it is variously estimated at from 10 to 50 per cent. increase on the previous year; "more was planted, and the cultivation was more productive—probably the best crop for many years." It is also affirmed, that at 5 cents per pound, this crop would be a better one than

others. The crop in Alabama is also pronounced to have been equal, or 5 per cent. superior, to that of 1839; though in some sections the dry weather and worm were subjects of complaint, and in some others, too excessively wet weather. The aggregate in Mississippi is large; "better than 1839, especially in the uplands; not quite so good in the lowlands;" in parts of the State it was "injured by snails or slugs," as in Panola and De Soto counties, also by the boring worm in Wilkinson county; and the Southwestern Farmer, of September 30, 1842, published at Raymond, gives it as "short," and says that there was "a great quantity of rotten cotton." In the same paper for December 23, 1842, the following opinion is expressed: "We should not take the surplus of cotton which has arrived in New Orleans this year over that which had arrived at the same port on previous years as any evidence of an extraordinary crop. The present fall has been unusually favorable for gathering the crop, and we believe planters will have finished picking at least a month sooner than common. Beside this, in our State much labor was turned to other products, and the little cotton raised has the more hands to pick it—another circumstance will make the earlier shipments the earliest part of the crop. Cotton on the Mississippi is generally trifling, too, this season, and the crop from that quarter will certainly be short. On the other hand, however, we learn that the crops of Tennessee and North Alabama are very fine. So that, taking all together, we should judge that the result will show our present crop to be only a fair one." In the vicinity of Vicksburg, we are told, that there was "an average crop on the uplands," and that "on the alluvial bottoms of the Mississippi it has proved very abundant, and a good quality. In Louisiana, the cotton crop, as the Southwestern Farmer likewise asserts, was "much injured by the army worm, rust, rot, boll worm, and rains;" that "from Opelousas to Alexandria, including all the adjacent country on both sides the Bœuf," there was "but little more than half a crop, and the army worm" was likewise "committing its ravages on the bayou Woekshu." On the other hand, it is estimated in other sections at "20 per cent. better than usual." The next produce of this crop in amount is Tennessee; and in the southern part of the State, the crop is said to have been unusually good, even "100 per cent. better" than the previous year. In Middle Tennessee, some complaint is made of the "cotton louse;" in the northern part of the State, attention has been turned more to other products. The yield in Arkansas was "greater than ever before," "double;" "the three counties of Sevier, Hempstead, and Lafayette alone," it is supposed, would ship "30,000 bales," being "10,000 or 12,000 more than ever before in one season." In Florida, the crop is estimated to have been 25 per cent. better than the previous year. The entire aggregate of the cotton crop for the year 1842, is 683,333,231 pounds.

The present low price of cotton will probably turn off a portion of the laboring force, usually thus employed, to the cultivation of some other products. A planter of Alabama asserts, that by an improved process of culture, he has been enabled to raise from 3,000 to 5,000 lbs. per acre, on land which, under the usual system, would not yield more than from 300 to 500 lbs. In one of his letters to the editors of the Albany Cultivator, he even says, that he has actually picked the enormous quantity of 5,989 lbs. on an acre, and affirms that he is prepared to prove satisfactorily, "that it is perfectly practicable to produce the 2,000,000 bags—the cotton crop of the United States—with *one third* of the capital engaged under the present system of culture in its production." Without any definite information as to his process, no opinion can be formed of its practicability. It seems,

however, incredible, and no reliance should be placed on such prospects until thoroughly examined, and demonstrated conclusively by the test of rigid experiments.

Although the experiment of raising cotton in India has partially proved a failure, on account of the hot weather, winds, &c., as in the Bengal district; yet, in some of the trials, it has furnished so great encouragement, that we have reason to believe it will not be abandoned. The comparison of the cotton imported into England from India and the United States, shows a steady advance on the amount received from the former country. Thus, in 1841, there was received from the United States 902,191 bales, from India 274,984 bales—being nearly equal to the entire consumption of cotton in the United States in 1840 and 1841, and more than one fourth of the amount sent that year from this country; being also 50,000 lbs. more than in the preceding year, in which the increase was at least 30,000 lbs. To show how this subject is viewed abroad, and without pretending to say how far the reasoning is justified by the assumed facts, we may here quote an extract or two from the letter of an intelligent writer from Liverpool to his friend in Boston. He says: "When in the cotton-growing section of the States, I was induced to think the India effort, on the part of the Government, would prove a failure. I based this calculation upon these data, that the skill, machinery, fertility of soil, cheapness of conveyance, and nearness to us, would enable the Americans to put down any competition. Since my return, I have conversed with a friend from India, who resided for a long time in Charleston, and was familiar with cotton growing, and who is now engaged in its cultivation in the East; and from facts furnished to me by him, I am satisfied I was wrong. The experiment in India will succeed; and the success will be both rapid and permanent. They will not only grow the cotton, but they will manufacture it, and supply us besides with large quantities of the raw material. What effect, you may ask, will this have upon the States? The first will be to drive the Americans out of the South American markets. In India they manufacture a coarse fabric (which just suits that market), cheaper than the Americans possibly can, and consequently, they will have in turn to yield. They can do a great deal more than most people, but they can not compete with pauper labor, or the cheap work of India, unless helped by home duties. The second effect must be to change the cultivation of a large number of the States engaged in the growth of cotton. The rich alluvial bottoms of the Mississippi may enable the planter there to cultivate cotton at four or five cents with profit; I suppose it will. But in Georgia and the Carolinas, if I am any judge of soil, it can not be done. If I remember right, the average crop in those States would not be more than 300 lbs. to the acre, and if so, cotton growing there will be a losing business."

Whether or not there is the immediate danger this writer predicts, of breaking up the cotton trade of several States, the subject is one which, at least, demands attention. The evil may be more remote, but it can scarcely be doubted that a serious competition is threatened from a number of sources. It appears, from information from high authority, that the British manufacturer has already begun to supply a cheaper article, made of India cotton, to the South American market, at three cents a yard cheaper; and threatens to destroy effectually that market for our countrymen. If Texas becomes established on a firm footing, and at peace, so that her rich soil may be brought under productive cultication, she will prove a powerful rival in raising this crop, and contending for the cotton trade.

The attention of the French Government likewise is directed to means to advance the culture of this product in French Guiana, and the increase of it also in Egypt, though not indeed rapid, must be taken into consideration, in estimating the probabilities of competition. Eventually, Africa, on the western coast, may furnish cotton at a moderate price, though this can not be for many years to come. The amount of the new crop of this year imported into Boston coastwise, from 1st of October, to 31st of December, exceeds the amount of the previous, year for the same period, by about 9,500 bales. The fact that Great Britain is directing her energies to extend her territory, and open for herself markets by commercial treaties, as well as by conquest, where she can, and especially, that she has avowed, and still avows, her determination to become independent of us in respect to cotton, should teach us, that she will never relinquish her purpose without, at least, a most severe struggle. The planter, therefore, must expect competition with the world over, wherever cotton can be produced, and that it can be on nearly one-third of the habitable globe, we have high authority for believing. While such competition continues, no great advance can be hoped for in the price of our own, especially so long as the great powers of Europe are at peace with each other. One thing, however, is certain, that no country can raise better cotton than the United States, and the reduction of wages, and peculiar adaptation of soil and climate, will, it is believed, enable the American planter to contend successfully in competition for many years to come.

The following table, taken from the Liverpool Price Current, under date of 9th of December, 1842, is subjoined as showing the comparative prices of cotton, from different countries, and also the sections of the globe where this staple is cultivated.

Sales of the week.	Current prices.		
	Ordinary to middling.	Fair to good fair.	Good to fine.
	d. d.	d. d.	d. d.
190 Sea Island	8½ to 9½	11 to 13	17 to 21
30 Stained	4 — 5¼	6 — 6½	7 — 8
5,740 Bowed Georgia	4 — 4⅞	5¼ — 5⅝	5⅝ — 6
4,440 Mobile	4 — 5	5¼ — 5½	5⅞ — 6¼
4,440 Alabama and Tennessee	3¾ — 4⅝	4⅞ — –	– — –
7,220 New Orleans	4 — 5	5⅜ — 5⅝	6 — 7
70 Pernambuco and Parubia	6½ — 6¾	7 — 7¼	7⅜ — 7¾
70 Aravati and Ceara	6¼ — 6½	6⅝ — 6¾	– — –
230 Bahia and Mario	6 — 6½	6½ — 6⅝	6¾ — –
1,180 Maranham	5½ — 5¾	6 — 6¼	6½ — –
1,180 Sawginned Do	5 — 5½	5¼ — 5⅜	– — –
– Demerara, &c.	– — –	– — –	– — –
470 Egyptian	6¼ — 6½	6¾ — 7	8 — 9
– Barbadoes	– — –	– — –	– — –
60 Peruvian	4¾ — 5	5½ — 5¾	6 — 6½
– Laguayra	4½ — 4¾	5¼ — 5½	– — –
– Common West India, &c.	4½ — 5	5¼ — 5½	6 — –
10 Carthagena	3¾ — 3⅞	4 — 4⅛	4¼ — 4⅜
10 Smyrna	– — –	– — –	– — –
– Manilla	– — –	– — –	– — –
3,400 Surat	3¼ — 3⅜	4 — 4⅛	4¼ — 4⅜
100 Madras	3¼ — 3½	3⅞ — 4	4¼ — 4½
– Bengal	– — –	– — –	– — –
23,150 bales.			

Rice.—In South Carolina and Georgia, where by far the largest portion of this crop is produced, it is said to have been a good one, equal or superior to that of the previous year. This article was formerly exported in the form of what is called clean rice, but of late years a much larger quantity is taken to England in a rough state called *paddy* or cargo rice. She, however, relies much for that article, on that which is brought from India, where vast quantities are produced. The whole aggregate crop of rice for the year 1842 was, by our estimares, 94,007,484 pounds.

Silk.—It is evident that the feeling with reference to this product is settling down on a more assured basis. While some remembering only the days of the morus multicaulis speculation, smile and turn with incredulity from its very mention, others have learned to discriminate between the solid and the imaginary, and are realizing, if not the golden dreams of past years, at least a fair profit, which not even the ridicule that is not always spared will easily tempt them by abandonment of their object to forego. The crop is increasing, not indeed with great rapidity, but with a steadiness, and among a class of persons who have turned their attention to it, that promises to render it one of permanent interest. The inflation of speculation has passed away, sober practical views are adopted, and the calculations of those best informed on the subject, are sufficiently cheering to warrant eventually, as they should now satisfy the feelings of the most sanguine. In twelve of the States a bounty is given, and comparison of this from year to year, is said to leave no doubt that the product doubles one year with another. It will be found that in every State the silk culture has increased. In New England the attention is turning yet more toward it, and much practical skill in management of the worm, and modes of manufacture is continually acquired. Large crops of cocoons have been raised in the States of Ohio, Indiana, Kentucky, and Tennessee. In Pennsylvania in one small district, not less than 3,500 pounds of cocoons are said to have been raised. The manufacture of the silk too, at the west and elsewhere, keeps pace with its production. There will be, it is said, several thousand yards woven in Ohio this season (1842), and several hundred in Indiana. Besides the larger establishments, there are also a large number of family machines making sewings and organzine, which last is the most profitable article ; as it is worth from $5 to $10 per pound in the gum. Sound practical farmers are going into the business of silk-growing, and this will tend to give it still more permanence. It is believed that not less than 2,000 bushels of cocoons have been produced the past season in middle and west Tennessee. At one establishment in Ohio four dollars per bushel is paid for cocoons, and the manufacture of silk goods is said to be at the rate of $1,000 per month, and at a profit of 10 per cent. over all the cost. One person is the proprietor of 3 large cocooneries, and expected to feed two millions of worms, which he calculated would yield him upward of six hundred thousand of cocoons, worth, at the then prices in October last, $2,000, but which, by his own manufacture of the same, would be worth much more to himself. A convention of silk-growers was held at Northampton, Massachusetts, in September, 1842, at which much valuable information was communicated by delegates and letters from various parts of the union, as to the progress method, &c., of culture of the plant, and feeding the worm. This has been imbodied and published in a small pamphlet, of which we have freely availed ourselves. The same causes which have had a transient influence on the culture of silk, have proved equally unfavorable to other products ;

the frosts, and the unusual weather of August and September, injured not less the crops of corn, the vines, and the grain, and fruit, than the worm. The permanent causes of soil and climate in general, however, are thought to be as favorable to the production of silk as to that of any other product. It can be cultivated in all the States, and there is therefore, nothing to forbid its yet being cultivated in all parts of the Union. The mulberry tree is indigenous with us, as well as in China, and this seems to indicate that Providence has designed this country to be more or less engaged in this pursuit. The business, too, is one in which the aged and the feeble can be employed, and the children of many a family may thus be trained to useful industry, as well as kept from idleness and poverty, if not also from vice, crime, the prison, and a shameful death. One who has paid much attention to the subject mentions, that he is confident the business is a profitable one, and that it will sooner or later become one of the staple interests. The south appears to afford peculiar facilities for conducting this culture on account of the climate; and although it is now, for the most part, abandoned there, yet it offers strong inducements to that section as an object of attention, which may come in to take the place of cotton, when the low price of that product renders it unprofitable of cultivation. The decline of the business in that region is not to be attributed to any inherent difficulties, or to the discovery that the business is impracticable or unprofitable, but to the disappointment of high-raised expectations excited during the mania of the multicaulis speculation. The American raw silk, it is perfectly established, is in quality superior to the foreign article. A person for many years, as he declares, engaged in the weaving of silk, in different establishments in London, having had (as he says) for 15 years, from 250 to 300 pounds of silk of every grade and name passing through his hands weekly, expresses the following opinion as to the silk, &c., of our country:

"I am qualified to affirm, from various experiments I have tried, that the silk is superior to any I have seen from Italy, China, France, Piedmont, or Valencia, where the worms are fed upon multicaulis or Italian. Its brilliancy, strength, and scent, are superior. I am aware that an exposure to the saline air, in the passage across the ocean, may be the cause of the loss of fragrance to imported silk; but the *brilliancy* is peculiar to American silk, if reeled in a proper manner, with cleanliness.

"I am confident that the mammoth sulphur worm is the pure Fossam brown. To try this, I had about three lbs. of silk reeled, and enclosed it in an air-tight box for three weeks. When I took it out, it had the fragrance of the Fossam brown stronger than any that I ever smelt in England, which convinced me that the mammoth sulphur is the identical silk which is always from 5 to 8 shillings per pound higher than ordinary silk. The mammoth white and the peanut white is a Novi, and superior to any I have seen in England. The yellow or orange I can not, satisfactorily to my own mind, yet define, but am trying experiments in order to ascertain. I am strongly persuaded it is a Bergam. Should this be the case, it will prove a great acquisition to manufacturers of silk velvet. Some have supposed the peanut white is the Piedmont, but they are mistaken. The Piedmont cocoon is lily white, very diminitive, with a sharp point."

Several facts may here be mentioned, which show that the difficulties which have been variously experienced in this pursuit may be obviated and removed.

A method has been suggested, which further operations will prove whether or not it may be relied on as a successful one, in relation to the killing of the chrysalis by means of the air-pump. If it succeed it will be a most valuable discovery, as it will preserve the fibre of the cocoon from the injury to which it is exposed by the usual processes. At one large establishment the same object has been effected by means of camphor; and it is said, that when the camphor is properly applied it effectually accomplishes the object, without inflicting the slightest injury on the silk fibre, and at the same time leaves the cocoon in the same state for reeling that it was before the chrysalis was killed. The air-pump, however, should it succeed, will be even better than camphor.

Another experiment relates to the retarding the hatching of the eggs. This has been tried with success, and the time delayed to as late a period as was desired. It has also lately been discovered that the leaves of the mulberry can be used to advantage for the purpose of manufacturing a good paper; and thus the silk-grower may profitably use his after growth of leaves. The question has been one of no little interest among silk-growers, how to cultivate the tree to the greatest advantage, so as to escape the dangers of the more cold climates. One person, who has devoted much attention to this subject, gives, as the result of his experiments, his opinion in favor of setting out the trees on dry warm land, in a state of middling fertility, four feet by two feet, one root in a place; and says that, thus managed, they are fully safe from the dangers of winter, anywhere between Canada and the gulf of Mexico. It is important that they be headed down in the spring, as they do not thus form roots. By laying the trees, and leaving them to stand as they grow, many thousand trees are lost. He also affirms that, after repeated trials, and much reflection and observation, he has found the Chinese method of feeding in the open places, instead of enclosed ones with an artificial temperature, the best one; and that the first third of the season is worth more than the two last thirds for feeding. It may not be improper to quote here the reasons assigned in the convention for anticipating the regular extension of the silk business:

"The regular extension of the silk business may now be expected and anticipated. 1. It has outlived the disastrous revulsion of 1839. 2. All our agricultural journals are now friendly, and most of them are zealously engaged in promoting it. The political press is everywhere ready to publish any candid statements on the subject. 4. Unprincipled speculators in trees have all left the field, and the whole silk business has fallen into new and better hands. They did the cause immense mischief. By their operations in 1839, and especially in the wanton destruction of their trees in 1840, they practically proclaimed that mulberry trees have no intrinsic value. It has taken the regular silk-growers two or three years to undo the mischief. Yet we have, in a very desirable and encouraging degree, done it. Trees are now appreciated, and some sales made at small prices. From this time the silk business can not be extended at all, without creating a corresponding demand for trees. 5. The new tariff, by placing this business on a level with other great interests of the country, gives it a passport to the confidence of business men. 6. Our manufacturers, in some cases, are now shaping their business in reference to taking up silk. Others will do the same, as the times shall seem to justify. This aids the growing of silk. 7. The amount of silk made in years past has been

rapidly increasing—each year just about doubling upon the preceding year. In all the States where legislative bounties are given, we have the means of showing this increase with great precision. The State treasurer in Boston gave the following statement, showing how this matter stands in Massachusetts:

1836 - - - - - -	$71 37
1837 - - - - - -	198 00
1838 - - - - - -	350 52
1839 - - - - - -	434 62
1840 - - - - - -	1,233 59
1841 - - - - - -	2,111 42
1842, to October 1 - - - -	3,351 91

In view of these results, secured amid all the multiplied discouragements that we have had to contend with, what may be hoped for, now that we have surmounted these discouragements, and gained public confidence. 8. Another consideration, calculated to urge the business forward, is found in the fact that all our present agricultural staples are now extremely depressed, and are likely to remain so. The market is completely glutted. Our farmers must take up something new, or their sufferings will be prolonged indefinitely. In this crisis, silk comes to their aid. In the production of this article they can not glut the market for one whole generation, most assuredly."

Without desiring to excite undue expectations, it is a question which deserves serious consideration whether much more may not be realized from the prosecution of this business than has hitherto been. The little town of Mansfield, in Connecticut, by a persevering devotion to it, undiscouraged by the ill success of others, has been enabled to derive therefrom a very good profit; and it appears from the last census that, with a population of 2,276, not less than $20,000 is annually received from this business.

The bounty paid in Ohio, in 1841, amounted to $2,681 76; in Pennsylvania, $4,418 55. In 1842, there was paid, as bounty, in Ohio, $6,699 61. The whole amount of reeled silk produced in Ohio is set down at 3,000 lbs. One person sold 300 lbs. of reeled silk for $1,600. The whole aggregate of the silk crop, throughout the United States, for 1842, has been given in our tabular view as 244,124 lbs. of cocoons.

It may be proper here to allude to a clerical error in the tabular statement of silk for 1841, in the last year's report, as relates to the State of Massachusetts. Owing to some mistake in transcribing and reducing the amount of cocoons from bushels to pounds, the amount was set down at 198,432 lbs., instead of 19,843, as it should have been. It was early noticed and corrected in several of the agricultural papers.

Sugar.—The sugar crop may be divided into that which is from cane, and that from maple and other sources.

The cane crop is confined almost wholly to Louisiana; and, from the best information we can gather, it is believed to have been, on the whole, as successful the past year as in the previous one, if not more so. The early frost and high winds threatened it, and were thought to have cut off the crop by thousands of hogsheads; the clear cold weather, however, succeeding, prevented it from proving so injurious as a milder and more moist season would have done. Even the frozen cane turned out very well, and thus nearly realized the full amount of the planters' expectations. The

capital employed in the production of sugar is said to be $52,000,000, and the average manufacture is probably more than $80,000,000 of lbs. and 4,000,000 gallons of molasses.

The amount of sugar manufactured from the SUGAR MAPLE has also increased during the past year; and from various accounts, in different sections of our country, it promises to be an article of much importance, and, as it can be refined equal to the best West India sugar, it may be exported. In some of the States it has doubled. Many of them possess large resources in this respect. For instance, it is said that there are at least 30,000 acres of land in Michigan which abound with the maple. A maple-sugar tree is considered worth, to the farmer, from two to three dollars for its sugar; and there are, on an average, in the sugar-maple districts, about 30 trees to an acre, which would give at least 900,000 trees, worth $1,800,000 —probably $2,000,000. By suffering a portion of these to remain, while clearing up their land, the farmers would be able to derive much profit from them, from year to year.

In some small towns in the New England States, as many as 30 tons have been produced during the past year. Much of this sugar, also, is made at a season of the year when the farmer there can not be occupied in the tillage of his ground, and the time consumed will amount only to a few weeks each year. Maple sugar, equal to the best Cuba sugar, is now manufactured in flat pans, and it is capable of being refined, and producing a very fine article.

The beautiful sample of maple sugar from Vermont, deposited in the Patent Office by the Hon. S. C. Crafts, induced an inquiry into the manufacture of the article; and a reference to Appendix No. 19 can not fail to gratify as well as instruct those whose curiosity or interest may lead them to investigate the process.

Comparatively little attention is now paid to the sugar beet, as an article of manufacture into sugar. That it admits of being successfully used for this purpose, no one acquainted with what has been done in France and other countries on the continent of Europe can doubt. The probability is, that it has not been attempted in this country on a sufficiently large scale to render it profitable. Yet large quantities of the beet root have been raised to the acre. The manufacture of beet sugar, which has been carried out so largely in France, seems to have greatly declined for a few years past, and will, it is supposed, be broken up, in the desire to sustain her colonies. Not more than 44 manufactories are reported as in operation there, in 1842: and the amount of beet sugar delivered was only about one-half million of pounds. Such, at least, is the account professedly derived from the report to the French minister, and published in Paris. The whole aggregate sugar crop for the U. S. in 1842 is estimated at 142,445,199 pounds.

Cornstalk Sugar.—Numerous experiments have been tried in various parts of the country, the past year, with respect to obtaining sugar from the cornstalk.

It could, indeed, hardly be expected that persons entering into it without much knowledge of the process of manufacture, and, in many cases, never having been furnished with any plan on which to conduct it, and possessing no requisite machinery, and before the difficulties attending its granulation had been removed, would be successful in their efforts. Yet the results have everywhere been so satisfactory, that, though but little sugar has been made, not one person from whom we have heard expresses a doubt of its

entire practicability, or the least discouragement. On the contrary, they, one and all, confidently assert that the product will yet become a great staple in our country. An excellent molasses, or sirup, has usually been obtained; and were this the only thing secured, yet, in this point of view, it would doubtless prove a great desideratum.

Mr. Webb, of Wilmington, Delaware, to whom the country is so particularly indebted for introducing this discovery to notice, and for his perseverance in demonstrating its practicability, made a definite experiment on a certain amount of land sown as he had before recommended. Speaking of his former views, he says: "These anticipations have been *more and more confirmed by every succeeding step in the investigation.*" He says further: "There was no deficiency in the *corn*, it was entirely in our mode of treating it; and, after all, the failure was only in crystallization." It appears that the corn was fully ripe before the least preparation had been made for manufacturing it; and after this, delays were occasioned by breakages incident to new machinery, by which the progress was so hindered that a considerable part of the crop was killed by the frost before it could be ground. He goes on to observe that the greatest part of the sugar he obtained was from this frost-killed corn, and says: "This fact is important, as it shows the superiority of corn over the cane." In this point, it would seem, he is mistaken, according to the account above given of the cane crop of Louisiana. He further says: "We obtained 50 gallons of sirup, which, being boiled to the density of sugar, was much richer and better than the best sugarhouse molasses; part of it was sold at $1 per gallon. We also had 10 gallons of sirup evaporated in broad shallow vessels; this crystallized readily, and made good sugar." Again: "Beside the products above mentioned, we obtained from the acre about 40 gallons of vinegar. The fodder was equal in value to two tons of hay, and there were 20 cartloads of stalks after passing the mill. One fourth of the crop was lost, in consequence of being prostrated by a storm late in the season, and another fourth from the stalk being imperfectly pressed. Considering everything, the result is satisfactory." For further particulars of this process of evaporation, reference may be had to the appendix, No. 2. A fair review of the progress of this experiment fully justifies his language: "I do not think that any manufacture ever promised better in the early stages of its introduction." In the Farmer's Cabinet for January, 1843, a correspondent of that journal, whose opinion seems entitled to consideration, remarks: "Few persons would be apt to calculate the expense attendant on even a small experiment in the making of sugar, whether from the cane, the beet, or the cornstalk; all who know anything about it, however, are aware of the fact that the process, even from the first, is proverbially laborious, careful, and expensive."

"Mr. Webb's apparatus cost him about $300. I should rather add $1,000 to that sum. In my own opinion, the cause of the failure in the attempts to make sugar from the beet has arisen from the single circumstance of its never having been taken up on a sufficiently expensive scale. In France there is no difficulty or delay experienced; but there the machinery is equal to the labor required." The writer also refers to Mr. T. Morgan, of Louisiana, and says, that, "according to his experience, the juice of the cornstalk, as stated by the saccharometer, is *two tenths* stronger than the juice of the Louisiana sugar-cane, a circumstance accounted for by the fact that the cane does not fully ripen in Louisiana, so that the juice is incipient."

On the other hand, the corn ripens perfectly, and then affords a juice properly corrected and matured, and hence defecation of it is remarkably easy. He further says: "I have been informed that Mr. Morgan was so well satisfied of the cultivation of the cornstalk, for the purpose of making sugar, that he the last year gave orders for the growth of a certain breadth on his sugar plantation in Louisiana the past summer, so as to give him a full boiling of juice for his vacuum pan, that the trial might be made on a scale sufficient to produce actual results, by which to calculate, in a pecuniary point of view, the real value of cornstalk in the manufacturing of sugar, but that his intentions were frustrated—levelled to the dust—by a storm, which prostrated the corn, and entirely ruined his prospects." Speaking of some samples of sugar manufactured by Mr. Webb, he says: "It has been objected that the grains are not so large and fully developed. It is only a wonder that any grains at all should be made to appear, from the manner in which the granulating process had been compelled to be carried on. Mr. Morgan, with his 10,000 gallons of liquor, at 45°, would soon be able to give a better account of the matter."

Mr. Blake, of Indianapolis, in Indiana, also tried an experiment on a larger scale; but, not having as much previous knowledge of the process as Mr. Webb had, did not succeed in obtaining sugar. He says that he made, in all, out of about 4½ acres, about 270 or 280 gallons of thick sirup; 25 *gallons of the juice made* 4 *gallons of this sirup*, and he is well assured that he left in the ground corn one third of the juice. His corn was planted four feet wide and drilled one way. He planted about six acres, but a portion of it was prostrated by a storm, and so was not used. He found that wooden cogs and journals for the mill would not answer, and recommends iron-bound and iron-plated, and metal cogs and journals. He had no previous knowledge of sugar making of any kind, and of course had to encounter all the difficulties of a learner. For boiling he used common 15-gallon iron kettles. The great difficulty he found was in arriving at the graining point in boiling. His plan was to boil the juice of the cornstalk as soon as the scum was removed down to a strong sirup, and then put it in a cooler or large tub, having two or three inch holes, one in a level with the bottom, the others an inch and a half from the bottom, and let it remain to the next day, and then boil it down to the graining point. He says also: "My main object in trying the experiment was to ascertain whether cornstalk contained saccharine sufficient to make it an object to cultivate it hereafter as one of the great staples of our State. On this point, I am satisfied that in a few years it will become an article of export, and of great value to the west." "My molasses is esteemed, by all who taste it, to be superior to New Orleans." "From experiments I made when I had got my mill to work well, I could grind 300 gallons of juice in about 18 hours' work with two horses, allowing one hour for each horse at a time. Two boys could attend the mill with ease."

From the best estimate I can make of the cost per acre in removing the ears, blading, topping, and cutting, hauling, grinding, and boiling, &c., it was between $12 and $15. Of course it would have cost much less if I had been as well organized as I could be were I to carry on the business upon the same scale hereafter. Boys can do most of the work." He also expresses his full intention to go into the business with a view to permanency and profit.

Others also, in Indiana, tried the experiment with various success; and by a communication from Mr. Plummer, of Richmond, in that State, it appears that, in all cases, the success equalled expectations as to the quantity per average acre; but the quality was not so fine as expected, and it was supposed some added more cream of lime than was necessary. The sugar, however, proved equal to about second quality New Orleans. He also remarks, that they found wooden rollers would not answer as well, as they were liable to cut in ridges, and thus much of the saccharine matter was lost. He further suggests, that, by planting the corn some days apart from each other, one mill might serve a number of persons, and thus the expense be lessened. The farmers there, he adds, as an evidence of their confidence, do not expect to open their sugar trees again.

The conclusion is expressed by several, that from six hundred to one thousand pounds of sugar may easily be procured from an acre.

Another person speaks of obtaining half a gallon of sirup from a bushel and a half of crushed stalks. Mr. Goodrich of Terre Haute, in Indiana, is also stated to have produced from eight gallons of juice two gallons of molasses, pronounced, by competent judges, equal to the best sugar-house molasses.

Mr. James T. Gifford, who tried some experiments with the cornstalk, on examination, found that the butt of the stalk remaining in the field retained its juice and saccharine matter until the hard freezing in November caused fermentation to commence, from which time the saccharine matter was too acid. It is also said, that sugar has been made of the water in which the ears of corn have been boiled; whence it has been inferred that the cob contains much saccharine matter. Mr. Knapp, of Waynesville, Illinois, in a communication made to the Union Agriculturist, for October, published at Chicago, says: "I hasten to say, briefly, that I have made about six gallons of maize molasses from what was judged (not measured) a barrel of expressed juice of the stalks. I find there is no difficulty whatever in clarifying the juice with hydrate of lime, skimming until it boils, and then straining through flannel. An immense quantity of extractive matter, in the form of a fawn-colored precipitate, is thus speedily got rid of, and the evaporation is then conducted in the same manner as in making maple sugar. There are two other mills in this neighborhood. At one of them, sixty gallons of molasses has been made from an acre. In regard to crystallization, I entertain no scruples, when the evaporation is conducted properly, and carried to the proper points." The experiment has been also tried, it is said, in South Carolina, even to granulation, without difficulty, with perfect success; and confidence in its importance, as a product, is expressed.

In the number of the Albany Cultivator, for January, 1843, a correspondent writes from Ohio, and, referring to an experiment of his own, says: "The result of this experiment has led me to the following conclusions:

"1st. That Mr. Webb's statement of the amount of sugar which can be made from an acre is not overrated.

"2d. That stripping the ears from the stalks is essential to the production of sugar, though not essential in the production of a much smaller quantity of excellent molasses.

"3d. That large stalks yield much more juice than small ones in proportion to their size, and that, consequently, the corn should be grown in drills, and not by sowing broadcast.

"4th. That the principal labor in making sugar from cornstalks consists in stripping off the leaves, and that this is most expeditiously accomplished before the stalks are cut.

"5th. That three quarts of juice will yield saccharine matter equal to one pound of sugar; or that eight gallons of juice will make one gallon of thick molasses.

"6th. That the manufacture of sugar from cornstalks is an object well worthy the attention of every family who has even one acre of ground to cultivate."

Such are some of the results of very imperfect experiments the first year after the announcement of the fact that sugar can be made from the cornstalk. They were commenced and prosecuted, in most cases, with the simple view of deciding a question on which, probably, nearly all who had just learned that such a thing was asserted, were, to say the least, somewhat skeptical. They, too, had no conveniences for the manufacture; and yet, with all these drawbacks to success, the question may be considered as faily settled by a number of independent witnesses, who need only a knowledge of the process, and skill and experience in conducting the trial hereafter, to ensure complete success. In order to aid in this desirable object, and as so many are interested in whatever may throw light on the subject, Mr. Webb's account, originally drawn up for the National Agricultural Society, will be subjoined in Appendix No. 3.

As numerous inquiries also have been made respecting the best process of clarification, a communication, detailing the mode, has been obtained from Professor Mapes, of New York, who has paid much attention to the subject, which will be found in Appendix No. 4. He, also, as will be perceived, expresses his conviction, from some experiments on the cornstalk, of its entire superiority over the sugar cane, if the enthusiasm of those who made the former experiments published, did not lead them into errors.

The French scientific journals contain some notice of this subject and a belief is there expressed that sugar can be manufactured from the cornstalk, and from the *fig cactus*, found in the recent French possessions in Africa.

There are some facts stated in relation to the manufacture of sugar from the cane, which, as they may apply also to that from the cornstalk, it is thought proper to subjoin. They have been mostly derived from Porter's Treatise on the Culture of the Cane. At 10° of Beaumé's saccharometer, it is said, there are in 100 lbs. of cane juice or sirup, 18 lbs., 6 oz., and 1 dr. of sugar. This, it will be perceived, is not more, if as much, as Mr. Knapp, and others, obtained from the cornstalk. The weight of water, besides what is termed the water of solution, to be evaporated to reduce the cane juice to a state of saturated solution, is 70 lbs., 9 oz., 6 dr. A saturated solution of cane juice contains five parts of sugar and three parts of water. This is indicated by 34° of Beaumé at the temperature of 82 Fairenheit. Seventeen ounces of lime are used for 300 gallons of cane juce. The greatest danger seems to be of using too large a proportion of alkali. The highest produce of 100 gallons of cane juice for nine years' average, on an acre of an estate selected in Jamaica, is stated to have been 122 lbs. of

sugar. The experiments above cited, with respect to cornstalk, would show an equal, if not a greater, average. It is evident, that the whole difficulty of granulation may be obviated by boiling immediately and quickly, in not too large quantities. The paper of Professor Mapes, in the Appendix, already referred to, will also furnish valuable information on this point. The southern States, who have heretofore been engaged in the manufacture of cane sugar, possess peculiar advantages in this respect, as they are already provided with the requisite machinery for grinding and boiling, and can apply their already acquired skill, no doubt, with great effect. Hence, we need not be surprised, if we should hereafter find them taking the lead in this business. It is a truly gratifying reflection, that, while the temperance reformation is so greatly lessening the consumption of corn in the manufacture of whiskey, the introduction of this manufacture of cornstalk sugar, promises to furnish a much more profitable as well as salutary application.

Wine.—As this product was set down in the table of the last report, based on the census statistics, it has been retained. It is believed, however, that no material alteration has occurred, as there is little to occasion any advance, and probably some causes on the other hand to discourage it. The cultivation of the grape, however, is still successfully continued, and several indigenous species have been tried and approved. The whole wine crop for 1842 is estimated at 130,748 gallons.

AGGREGATE CROP FOR 1842.

The entire aggregate of the crop for 1842 thus appears to be very great. Although lessened in some States, yet the amount of the whole is much increased. The estimates might have been larger, but the aim has been to *fall short* rather than *exceed* the truth. Very many interesting deductions and comparisons might be made in reference to the individual States, and the proportions of particular products raised to the population; but these must be left to each one to form for himself from the data furnished in the tabular estimate.

The amount of breadstuffs, including corn and potatoes, is 716,147,950 bushels. This allows for each man, woman, and child, of our whole population nearly thirty-nine bushels; or, should we estimate the quantity for each individual according to the usual allowance in England, the surplus product would be very great.

It should be recollected, also, that the mere breadstuffs and potatoes form by no means the whole amount of surplus food, as the last census shows a vast amount of other articles of this description.

OTHER PRODUCTS NOT EMBRACED IN THE TABLE.

It may be well here, also, to allude to certain products not mentioned in the tabular estimate, which have been sometimes proposed as offering some encouragement to the agriculturist to engage in raising them, and thus add to the means of employing the labor which must be given to agriculture, and which, yet owing to the vast surplus of the grain, &c., above the home consumption, seems to promise but little profit.

One of these is *broomcorn*, which is much cultivated (and with success) in some towns on the Connecticut river, in Massachusetts. The amount

produced on one acre varies from 800 to 1,000 lbs., beside 60 or 70 bushels of seed. The brush is said to be worth 4 or 5 cents per lb.; in 1837, it was worth 12½ cents per lb. The seed on an acre, at 33 cents a bushel, is said to be equal to a crop of oats. In Northampton and its vicinity, not less than 1,300 acres are thus cultivated, worth, for the brush and seed, $100,000. The seed usually weighs 40 lbs. per bushel. The manufacture of brooms in a small town (Hadley) in Massachusetts is estimated at $160,000; 80,000 brooms were manufactured by one man in a year. To a limited extent, this culture of the broomcorn and its manufacture might be yet more extensively engaged in with advantage. The process of cultivation is similar to that of maize or Indian corn. Further details are given in Appendix No. 5.

Another article toward which attention may be turned is *madder*, of which it is said 5,000 tons are annually imported. This, however, being a plant of three years' growth before any advantage can be obtained from it, is not likely to engage much the attention of our agriculturists.

The *safflower* and *saffron*, which have, perhaps, been confounded by many persons, are other articles of the dyestuffs which have sometimes been suggested as objects worthy of attention. The first of these yields a rich pink dye; but, for various reasons, it can hardly be much of an object to our farmers. Owing to its high price, the demand for saffron is much more than for the safflowers.

The *rhus cotinus*, or *sumach*, has also been recommended. Many thousand tons of this product are annually imported from Trieste. It is a perennial plant, and it is said might yield two crops in a year; and it is supposed that, as it bears a strong resemblance in many respects to the sumach indigenous with us, it would succeed and be profitable.

The crops of the various roots, of peas, beans, &c., for animals as well as for vegetables for the table, are increasing. A new addition to these has been suggested in the *hog root*, a species of the arum, and possessed of much nutritious matter of which swine especially are particularly fond. Among other recommendations, have been mentioned its great productiveness, and that it is indigenous, being very abundant, especially in Virginia.

Cranberries abound in vast quantities in the moist prairies in Michigan and some of the western States. By means of a newly invented rake, very simple in its construction and not expensive, 40 bushels may be gathered by one man in a day; and a cargo of 1,500 bushels has been sent to one of the Atlantic States, from the northern part of Indiana, in a flat-boat, at one time. The price which this product of ten commands in the markets of the cities along the Atlantic varies from $1 50 even up to $2 50 or $3 50 per bushel. They can be gathered at the west at an expense of not more than 50 cents per bushel. The duty on them in England is not more than 2 cents per gallon by direct trade. They may also be made to produce largely by cultivation. Sir Joseph Banks is said to have raised them at the rate of 460 bushels by the acre.

Ginseng is an indigenous product, and it is raised in large quantities at the west. This is an important article of export to China, and the amount sent out to that country within the last 12 or 15 months is said to be upward of a million of dollars in value.

To the same country, also, now becoming particularly important to us by the additional facilities of commercial intercourse, large quantities of *lead* are also shipped; 100,000 pigs, weighing 3,000 tons, valued at $250,00 0

were sent there, from the west, in the year 1842. This, beside being a western product, is so intimately connected with the question of diversion from agricultural labor, that the mention of it in this place does not seem improper.

A new method of preserving *eggs*, by packing them in salt, with the small end downward, and by which they have been kept perfectly good for 8 or 9 months, will, it is believed, enable the inhabitants of portions of our country where these abound to make them profitable. Thousands of bushels may be sent off to the Atlantic markets. Great quantities are used in France; and as the duty on them in England is so low (not two cents per dozen), they might bear exportation. They have been gathered and sold at the west as low as 90 cents per bushel; which, as a bushel contains 45 dozen, is but 2 cents per dozen.

From present experiments, the introduction and raising of *sheep* on the vast prairies of the west are to be anticipated, and it would not be surprising if there should be a great change in the territory to which the consumers of wool must look for much of their raw material. Hitherto, the New England and middle States have principally furnished the market with wool. But sheep are already beginning to acquire importance in the view of the farmers and planters of the west and south; and if the importation of 1,100 merino bucks in a single year into South America produced such a change in their flocks, why may not equally as striking a result be effected in the western and southern States by a similar introduction there? Millions of sheep could be sustained at little expense on the belt of the oak timber land running through Georgia, 70 miles wide by 150 miles long. Indeed, there is scarcely one of the southern States but would furnish some good section for the keeping of flocks on the uplands. Planters are now also actually beginning to collect their flocks. The sheep-raising States of the north must expect competition. The farmer in the higher and colder latitudes, who has to fodder his flock for a long winter, will certainly feel the effect of this new direction of sheep husbandry, brought, as he will be, into competition with those who enjoy the advantage of an almost perennial spring. So soon as the planter ceases to be absorbed in the production of cotton, the streams of the south will be lined with mills, and the various operations of machinery. The northern and middle States can not but see that it will be so. There are many locations south and west of the Delaware, where three sheep at least can be kept as cheap as one can on the confines of the Canadas.

Pasturage to almost any extent covers the prairie range, and grass and grain for a short winter's feed are cut and reaped by machines at a trifling expense. One gentleman, it is stated, in the vicinity of Buffalo, New York, having a prairie farm in Illinois, of some 500 acres, purchased 2,000 sheep, which he placed upon it, under the care of two faithful shepherds. The sheep were kept without difficulty in the best of health, and the proprietor, as the first fruits of his enterprise, received 6,000 pounds of good wool, worth 30 cents per pound. The transportation from Illinois to Buffalo cost about one cent per pound. These facts are mentioned, not to discourage effort, but to prepare the producer of wool to meet the condition of things that must soon take place in a state of general peace and depression of price of all the staple products. By the last census, it appears that there are in the United States about twenty millions of sheep. It has been thought by those who have paid attention to this subject that this number

is much too low; and the supposition has been made that there are not less than thirty-four millions of sheep in this whole country, of which one fifth are in New York. The safer estimate would probably be about twenty-five millions; the estimated value of which, at $2 per head, would give $50,000,000. Three sheep is the general allowance per acre for winter provender and summer pasture. The aggregate quantity of land necessary is more 8,330,000 acres; which, at the average of $15 per acre (perhaps it would reach even to $20), would be nearly $125,000,000. The amount of wool produced at an average of 2 pounds the fleece is 50,000,000 pounds, which probably, at the lowest average price, is equal to $12,000,000. It will thus be seen that this object is one of no little importance, and that, therefore, it deserves a place while suggesting diversions of labor which may be anticipated.

Another product connected with the clearing up of lands by new settlers is that of *pot* or *pearl ashes*. The latter of these can be prepared for the market very easily in the form of black salts, and at little expense. These are said to find a ready sale. Potashes, also, may be produced, though it requires a somewhat larger expense of capital. Five hundred pounds of pot or pearl ashes for one acre of good timber is said to be a very safe calculation, and this sells at $25. Every 400 bushels of ashes carefully saved will produce a ton of pot or pearl ashes, into which they can be turned in 36 hours. For some further details of this subject, reference may be made to Appendix Nos. 6 and 7. It appears that 2,437 casks of ashes from one port were exported in 1842, valued at $48,740.

The tabular statement contains no columns devoted, as in the report for 1841, to the domestic animals, the produce of the dairy, orchard, and horticulture; but it is evident, from all the information which has come under the notice, that these are also steadily advancing. Agriculture is yet destined to experience a great impulse from the new light which is just breaking in upon the farmer, as respects the composition of soils, manures, &c. An agricultural literature is forming of a most important character; and, by the revolution in the mode of publishing books, it may be expected that ere long our farmers in the remotest parts of the country may feel the effect of such a diffusion of combined scientific and practical knowledge. Liebig, Daubeny, and Johnstone's works, and others, which have recently been brought before the public, contain much information on the important subjects of analysis and adaptation, and the effect of various kinds of cultivation and enriching of the soil. And here, too, it may not be improper to mention another work, in itself a treasury of knowledge in agriculture, and everything kindred to it—Loudon's Encyclopædia of Agriculture. Perhaps it would not be too much to predict that, in the course of years, an entire change will be wrought in the mode of applying manures. The wonderful skill of the Chinese in improving their soil, not so good as most parts of our own naturally, by which they are enabled, as it now well ascertained, to support a population of more than 300,000,000 throughout their vast empire, is owing to their wisdom and care in adapting their manures and modes of cultivation to the peculiarities required by the soil. As they separate its enriching elements, rejecting the parts that can have no such effect, they are not constantly exposed to a new growth of weeds, the seeds of which are sown among the loads of compost, and other manures carried out into the field. Hence a weed is a rare thing in their fields, and as soon as it makes its appearance is easily seen and eradicated. The time

is not far distant when the ammonias, silicate of potash, phosphates. &c., which render a particular manure valuable, will be prepared and used in the form of salts, or in a liquid form, sprinkled over the soil, instead of whole loads being carted out from the barn yard and compost heap for this purpose. It needs only the diffusion of such knowledge, and the successful trial by some of our most intelligent and practical farmers and planters, to overcome the prejudice against changes like these, which would do so much to benefit our agriculture. As an evidence of this fact, it may be mentioned that many acres of worn-out lands in Virginia have been recovered by the skill and toil of enterprising farmers from New England and New York, so that farms under this culture in many instances have been doubled, and even tripled, in value.

It is gratifying also to observe that the attention of the State Legislatures are more and more turned to the subject of agriculture.

The State of New York, by a law passed May 5, 1841, appropriated $8,000 per annum, for five years, for the encouragement of agriculture and household manufactures, to be divided between the county societies, which raise a certain sum of money for the same purposes. Had a longer time been permitted before the transmission of the report to Congress, reccurse might have been had to the valuable report of the New York State Agricultural Society, which is yearly required by the provisions of the State law.

LARD OIL, ETC.

The subject of the manufacture of *oil* from *corn* and *lard* was introduced to the notice of the public in the report of last year. As corn oil has heretofore been connected with distillation, although it is easily made and answers a good purpose, less attention has been devoted to it. It has been suggested, on high authority, that it can be gathered from the mash which is prepared by fermentation for feeding swine. If this should be confirmed by further experiments, as it would not be liable to the same objection urged against the former, the manufacture of spirituous liquors, it may hereafter be carried on to great extent. No doubt seems to be entertained of its value for burning, and all other purposes to which oil is applied but painting.

Much interest has been felt in the subject of oil from lard, and the almost daily inquiries respecting its process of manufacture, &c., and its close connexion with the question of disposing of our agricultural products, forms a reason for giving it a more extended consideration in these remarks. Complete success has attended the enterprise, and the number of those engaged in prosecuting the business is continually increasing. Several large factories for the manufacture of this oil have been some time in operation in Cincinnati, and thousands of gallons are daily prepared for home consumption and exportation. It is also carried on at Cleveland, Ohio; Chicago, Illinois; Burlington, Iowa; Hannibal, Missouri, and other places both in the western and Atlantic States.

It is considered much superior to olive or sperm oil for machinery, and for the manufacture of woollens, &c. It can be furnished also at half the price, and therefore, it will doubtless supersede that article of import. As it contains less gelatine than other oils, it is found much better for combing wool, for which purpose a single factory wished to contract for 10,000 gal-

lons from one establishment. It is also undergoing trial in England; and, if it succeeds, of which there can scarcely be a doubt, large orders for it may be expected, or at least the American lard itself, which pays a less duty, will find a ready market. An order for 600 gallons, with this view, has already been received for the use of a cloth factory in Huddersfield, England. It has also been stated in the journals, that a gentleman is about taking out a large quantity, recently ordered from the West, for the purpose of trying it there as an article of trade, and it has recently been stated that 16,000 bbls. have been sent from Cincinnati to England. Repeated experiments, too, have shown that for the purpose of combustion, no oil is superior. It is important, in trying it with this view, to obtain a good article, manufactured from good lard, and not from the dark-burnt, which creates smoke and clogs the flame. For want of sufficient care in this respect, some have no doubt met with disappointment in their attempts to substitute this oil for sperm oil in the lamps.

The following are given as the relative constitutents of lard oil and sperm oil, in one hundred parts of either:

	Carbon.	Hydrogen.	Oxygen.
Lard oil - - -	79.03	11.422	9.548
Sperm oil - - -	79.05	11.6	8.9

It will thus be seen that the difference in carbon is only $\frac{2}{100}$; about the same in hydrogen; while in oxygen it is about $\frac{4}{10}$ in favor of the lard oil. The large quantity of carbon proves that it may be relied on as a material for giving light, as it is well ascertained that whenever carbon predominates in an animal oil, the article is capable of a high degree of luminous power. Experiments have been made by Mr. Campbell Morfit, of Philadelphia, which may be found mentioned in the paper furnished by him in Appendix No. 8. These resulted in favor of lard oil. About 60 lbs. in 100 of good lard, in tallow only 28, is oil; and the processes of manufacture resorted to, show that it may be made a profitable business. Large orders have already been executed at the West for this oil, to be used in the eastern States. The heat of lard oil for the blow pipe has been found to be much greater than that of sperm. Lard itself melts at 82° of Fahrenheit; its specific gravity at 60° is 0,938. Lard crystallizes in small globules; sperm in flakes or scales. It is soluble in boiling alcohol. The proportion is 80 gallons of lard to 1 of alcohol. The application of stearin for candles, which was also alluded to in the last year's report, promises greatly to reduce the price of that article, as will be seen by Mr. Morfit's letter, already alluded to in the Appendix No. 8. He thinks that the price of such candles, equal to spermaccti, may be eventually reduced to 12½ cents per pound.

As the capillary attraction of lard oil is not so great as that of sperm, it is recommended that the form of the lamp should be such as to bring the bulk of the oil as near to the point of combustion as possible.

It is also recommended, that the tube should be filed thinner at the top where the wick is inserted, to prevent the escape of heat. Various lamps have been constructed for burning lard as well as lard oil, which have been found to answer very well. The solar astral lamp, for this purpose, affords a light unsurpassed by any other for brilliancy and quantity of luminous power; and the letter of Mr. Milford, collector at Cleveland, Ohio, (Appendix No. 9), shows that the burning of this oil has been intro-

duced with entire success into the light-houses on Lake Erie. An objection has been made against lard oil, that it is not capable of being preserved in a liquid state in cold weather; but by a process similar to that by which the winter sperm is prepared; lard oil can be made which will not chill at 30° Fahrenheit.

The importance of this application of lard can scarcely yet be realized. Vast quantities of the oil can be manufactured at the west. Indeed, there is hardly any assignable limit to the power of production of the article, so that, while the demand continues, the business may be conducted profitably. The immense herds of swine which can be suffered to range over the lands adapted to them, and gather their food from mast as well the surplus of corn, wheat, potatoes, &c., on which they may be sustained, admit of the manufacture being carried on to almost any extent.

The proportion of lard to the whole hog is about 60 per cent., after taking out the hams and shoulders or taking out the hams only; the estimate for hogs of the best breeds, and so fed as to produce the greatest quantity of fat, is 70 per cent. As the object is not in this case to make pork for food, the objection against those species of nuts, and other modes of feeding which render the animal more gross and oily, is obviated; and it has been proposed to feed out oil cake to swine, to increase the proportion of oil.

An important letter, in relation to the manufacture of lard oil, &c., will be found, together with Mr. Morfit's account, before mentioned, in the Appendix Nos. 8 and 10, the necessity of the publication of which is every day becoming more and more apparent from the continual demand on the Patent Office for copies of the mode of extracting the oil from lard. The specification of one manufacturer who has patented his process has also been added for the same reason, as numerous copies are continually requested (Appendix No. 11).

By a new process of steaming (a very simple method, a description of which will be found in the letter of Mr. Stafford, beforementioned, in the Appendix No. 10), it appears that the whole of the lard or oily matter in the hog, or of tallow in cattle, may be obtained; while the danger of burning (common in other modes) is avoided, the consumption of fuel lessened, and the degree of pressure required not so great as otherwise. It will be recollected that, while conducting the manufacture of lard, the other parts of the animal, as the hams and shoulders, may be turned to profit. Beside these, also, the hides may be tanned by a cheap process; and the bones, which are worth half a cent per pound, may be calcined and made into animal carbon, for which they are said to be worth, in this calcined state, two and a half cents per pound.

Oil is likewise made of the SUNFLOWER—35 gallons to an acre. The cultivation of the CASTOR BEAN continues to be carried on with increasing success for the manufacture of castor oil, which may also be turned into stearin and oil for burning. A single firm in St. Louis has worked up 18,500 bushels of beans in four months, producing 17,750 gallons of oil, and it is stated that 800 barrels have been sold at $50 the barrel. This oil, likewise, admits of being prepared for machinery, soap, &c., and it is much more soluble in alcohol than lard. A new experiment, too, as to the introduction of RAPE SEED, for the same purpose, promises much success, as it is found that rich ground will produce from 25 to 40 bushels to the acre. Ten quarts of oil may be obtained from a bushel of the seed. Oil cake is worth, per bushel, about the same as oats. This oil sells for from 75 cents to $1 the

gallon. For further details, as to this experiment, reference may be made to the letter of the postmaster at Erie, Pennsylvania—Appendix No. 12.

A more beautiful article of lard is now also manufactured, which is of the purest white, and much harder than the ordinary kind, and which thus possesses additional advantages for exportation, as it will bear being sent to the warmer climates, and can be prepared by a rapid process which costs not over half a cent the pound. The details of this will be found in Mr. Stafford's letter previously referred to in Appendix No. 10.

These various articles just mentioned, have been brought together, as they are of a kindred character, and constitute a branch of business which is probably destined to become a most important one in our country. It may be well, indeed, to look at this subject a little more closely, and in detail to ascertain the means we have of future production, as this lard is one of the articles on which the duty in England and France are so low as to bear exportation. In the first place: What are the materials of manufacture at home? The live animals can be raised at little comparative expense; and this business, as we have before said, can be carried on to almost any extent.

Few persons, who have not taken the trouble of calculation, are aware of the results of an examination into this subject. It would be thought strange, were the assertion made, that the export of oil, pork, and lard, were the market opened to us, might be equal to that of our heaviest staples—even to that of cotton; but it is believed that it can be strictly demonstrated that not only this is true, but that it might reach in value beyond all the exports from this country the past year. The calculation is an easy one: Pork can be raised in all the States; and wherever there exists mast and wild vegetable roots, the expense is very trifling; for, it will be remarked, that for the purpose of making oil, it is immaterial how great is the degree of oleaginous food, which is given to swine. Beech, oak, hickory, and walnut, all furnish excellent food. Corn, too, may be raised on the prairies at $3 per acre, standing in the field, where the swine are turned in to feed; making the cost 6 cents per bushel—allowing (which is a fair estimate) 50 bushels to the acre. If any one doubt the practicability of this, it will only be necessary to consider the fact, that one man can attend to 40 acres, which, beginning early in the season, he can plough with horses at the rate of 2 acres per day, plant with the cornplanter from 5 to 10 acres a day, and then till it with the cultivator. At $3 per acre, the supposition beforementioned, this would make his receipt for the 3½ or 4 months employed $120 or $30 to $35 a month, for, wages, expenses, &c. As a further means of keeping the swine, rye may be sown on the ploughed sod to furnish winter food; and, by taking them off in the spring, a crop of rye may be raised, making a good sustenance for the swine—they being turned in to feed upon it standing after it is ripe. It has likewise been found, that since the animals scatter some of the grains on the field, the same piece of ground will yield 2 or 3 seasons without any extra ploughing. It may also be remarked, in passing, that rye pastures are found to be excellent for wintering cattle without injury to the crop of grain, if the stock is taken off early in the spring.

Such, then, are the facilities for raising swine. We can, however, carry the calculation further. The number of swine reported in the census for 1839 is over 26,300,000. There is reason to believe that the number has very greatly increased in many of the western States since that time. Thus, it is stated, that, in Michigan, in 1837, when the State census was taken, the umber of hogs reported was 109,096; in 1839, by the United States census,

was reported the number 342,920, being an increase in only two years of 232,535, or more than 100,000 in a year. It is supposed, by a writer who appears to be well acquainted with the products of that State, that in 1841 there were not less than 700,000 swine in that State; according to which ratio there would probably be now over 1,000,000. The whole number in the United States, therefore, estimated simply at an increase of 5 per cent. the year, would now exceed 30,000,000. Taking this, therefore, as a fair estimate, and allowing that one half of them should be fatted to average 300 lbs., and for the purpose of lard they would need to weigh 300 or 400 lbs., we should have the following results, viz: 15,000,000 hogs, weighing 4,500,000,000 lbs. Deducting the two hams, which might be estimated at 20 lbs. each, allowing also a loss of one third in curing, is equal to 400,000,000 lbs., and trying up the remainder, equal to 39,000,000 lbs., on which 60 per cent. of lard might be obtained, gives 2,340,000,000 lbs. of lard; and since 8 lbs. of lard equals a gallon of oil and stearin combined, this amounts to 292,500,000 gallons, which is equal to 9,285,714 barrels. This is more than 25 times the amount of sperm and whale oil annually brought into the United States, including also palm and olive oils. Allowing 40 lbs. for the two hams, as we have seen, gives 400,000,000 lbs. Estimating now the lard oil and stearin combined at 50 cents per gallon and the hams at 6 cents per lb., we have the enormous sum total of $170,250,000. This would probably equal over three times the export value of cotton at the present low price or perhaps even the whole crop for this year; as the whole crop for 1842, according to the best estimate which a careful examination enables us to make, amounts to 683,333,231 lbs., which at 6½ cents per lb., is $44,416,650. This, too, is nearly double the whole value of our exports, as appears from the report of the Secretary of the Treasury.

It is, indeed, admitted that we have not and probably may not for a long time, if ever, have so large a quantity of lard and hams for exportation; but the supposition is only made to show the capabilities of the country in this respect. There is not the slightest difficulty, were the effort made, in doubling the number of swine in the United States, so that the whole surplus above the present number could be thus used for the manufacture of lard and oil. Besides, the articles mentioned in the case supposed above do not require salt, and may be preserved with great ease, as well as allow the animals to be killed earlier, so as to secure a full market; and the former is a consideration of no small importance, especially in portions of the country where salt is high. It will be found more profitable at present, at the price of lard and oil abroad, to use the whole hog for this purpose, the hams and sides excepted. It should be mentioned, too, here, that in the above calculation no account has been taken of a variety of article which are worth something, and which might aid to defray the expense of the preparation of the lard and hams. Thus, as to the hides, they may be taken off with the hair at about the same expense as by scalding, and may be tanned at $5 per dozen, or preserved by sprinkling the fresh hides, spread out smooth, with salt, laying one over another, flesh sides together, until there are fifty or sixty together. They can then remain in this state until cured, and may be rolled up and transported to any market. The leather of these hides, when tanned, is used not only for saddles, collars, trunks, but also for binding books—a substitute for Russia leather—and many other purposes. The bristles will pay in part for preparing the hides for the market. Hides, when well cured, will bring, it is said, from $15 to $50

per dozen. Hams, too, are said to be better when cured without skins, as the gum of the skin injures the taste of the meat and retards the salting operation.

It may be remarked here, also, that a demand for oil and candles from lard will of course greatly advance the price of pork for consumption, and thus, while a new staple is created, an old one is greatly improved. An increase of only one cent per pound on swine slaughtered in the United States, will make an aggregate in value of at least $30,000,000. This sum would not, indeed, actually be realized in cash, as little pork, comparatively, is now sent to market, but is consumed by the family where it is raised. *That country which produces beef and pork to most advantage, and especially if wheat is also added, must excel in agricultural profits.*

FOREIGN MARKET.

In looking at the details just given, evidently proving the immense resources our country possesses in these products, as they may properly be termed, of her soil, the question naturally arises: Is there any demand for them abroad? It can be shown, it is believed, that this demand is greater than has been supposed, and that it seems likely to increase. A part of the bearings of this subject will be brought up in connexion with another portion of these remarks; but it may be well here to observe that from New Orleans the export of lard for the year 1841 and 1842 to foreign ports was 172,260 kegs, while that to the ports of the United States was over 260,000 kegs.

To Cnba, whose exports to the United States have much exceeded her imports from this country, as appears from the report of the commercial relations of the United States by the Secretary of State, there were shipped, during the year 1838, 5,484,028 lbs., valued at $368,146, at a duty of four cents per lb. The desire to obtain lard from abroad has induced England to admit it into her ports at less than half a cent per lb. duty when taken in American vessels, or when taken through the Canadas at less than one eighth of one cent per pound. The duty in France is a little more than two cents per pound, to her colonies not more than one half a cent per pound; when sent to the Netherlands and Belgium, one mill per pound; in Texas it is free; in Venezuela, four cents per pound. Large quantities of the olive oil, for which lard can be substituted, are used for making soap. In Marseilles, it is stated on good authoriry, that no less than 17,000 lbs. are thus used daily.

IMPROVED MODE OF FENCING.

While the cultivation of timber land will be hastened by the new method, heretofore described, of making pot and pearl ashes, where the preservation of wood is not an object of interest, an improved mode of fencing the prairies gives great facilities for converting what has been hitherto deemed almost waste land to immediate use; and when it is considered that, as appears by an estimate made at the Land Office, there are in four States and two Territories, 39,000,000 of acres of prairie lands, viz: in Illinois 11,000,000 acres, in Indiana 5,000,000, in Missouri 9,000,000, in Arkansas 4,000,000, in Wisconsin and Iowa, restricted to surveyed lands alone, each 5,000,000 acres, some of which are quite remote from timber, it must be matter of congratulation, especially to those States, as also to the United

States, still holding portions, to know that such lands can now be enclosed with one fourth the expense of a Virginia fence. Where a section of 640 acres is enclosed, it may be done at a cost not exceeding forty cents per acre, where the labor and materials are all purchased. The fence now recommended is composed of a ditch and embankment of three feet high, or a fence three feet high on the top of the embankment. The hedge fence, so much commended in Europe, will not answer for the prairies, as the weeds grow up with the hedge, and thus furnish much fuel to consume the hedge in its earlier growth, or even in its more matured condition; and this will be the case until general cultivation protects the prairie from annual fires. The ditch, too, of itself alone, is a poor defence against the effect of frost, and the attacks of cattle. A combination of the two seems to offer all the advantages of both, as the soil is drained by the ditch, and the same forms in part the fence, thus saving much timber.

It requires 26,500 rails to enclose a section of land with the Virginia panel equal to eight rails, stake and rider, whereas, it takes only three rails for a panel on the plan of the ditch and embankment; nor is this all, the rails on the embankment need not be over one half the size of those in a Virginia or worm fence. The great saving will be apparent when we reflect that four panels of Virginia fence are equal in distance only to three panels of fence made straight. Three rails on the embankment are sufficient. Hence, nine rails on the latter plan are equal to forty on the former one; and when the difference in the size is taken into consideration, the proportion will not be over four and a half to forty, making a saving in timber, in carting, and hauling, &c., almost incredible. In the success of such a plan the United States are deeply interested; for it must add millions of dollars to the Treasury, besides enhancing the value of land now likely to remain a long time without improvement, and saving from destruction the vast quantities of timber which the enclosure of the prairie- in the ordinary mode of fencing, would require. This plan, having been made the subject of great attention, and found to answer the purpose, can be safely recommended The machinery to accomplish all that is described will not exceed $10, and may be constructed by ordinary workmen. Drawings of the plough and scraper, and the machinery of its construction, with a description in full of the manner of making the fence, will be found in Appendix No. 13. A model, also, of full size, of both the fence as standing and the various machinery, may be seen at the Patent Office. A letter from a gentleman at the west (see Appendix No. 14) fully sustains the above opinion of its practicability.

MODE OF CONSTRUCTING HOUSES.

Another improvement relating to a cheap mode of constructing houses where timber is scarce, which shall be at once durable and comfortable, as it has a most important bearing on the vast unoccupied lands of the several States and the nation, may not be inappropriately mentioned. Its full advantages may be appreciated by an examination of the plan, which will be found in a detailed statement, for which see Appendix No. 15. Many who have been made acquainted with this method have deemed it most desirable to have it published for the benefit of the country at large.

RAILROADS.

Connected with this general subject likewise, an allusion may be here made to a plan of constructing cheap rails with a wooden track for horses.

Although it has not been practicable to obtain the details in season for this report, yet it may be mentioned that, according to an account published in the various journals of the country, and which appears entitled to credit, a railroad of seventy-six miles has recently been undertaken, between the Ocmulgee and Flint rivers, by associated labor, under the direction of General A. H. Brisbane, of Georgia, at a cost, beside the labor of the association, of not more than $15,000, and with a force of only one hundred and fifty men. There seems reason to believe that this plan might be adopted to great advantage in many other parts of the country, and modes of communication opened to all the advantages of the market, with a comparatively small expense. The travel on such roads may be usually at the rate of about ten miles an hour, and the materials for the construction and repair of these wooden tracks may be easily at command.

An improvement of railroad cars has been suggested by Mr. Grant, having one wheel fast on the axis, and permitting the other to revolve. This plan, with three axles connected by a movable joint, will enable the car to turn on a very short curve, with very little abrasion. For the track, the grading might be done with the scraper adopted for making fence, described above. The track might be made of wood, simply by imbedding cross-ties every few feet, and laying timber, squared on two sides, only adding on the top a ribbon of hard wood, three by four inches. Horse power can be applied to great advantage, as the friction is but little on this track, compared with ordinary roads. Upon this plan, with moderately undulating ground, no grading need be made. Places for turn-out are made as usual; and, where travellers wish to stop for the night, a platform of smooth boards is provided. This track is made seven feet wide, to accommodate farmers in the transportation of produce. A model track may seen at the Patent office.

FUTURE SURPLUS.

From the foregoing remarks respecting the crops, &c., it will be seen that we have already a vast undisposed surplus of products above our home consumption, and the resources of the country, in the soil and means of production, are almost beyond limitation. Yet there is reason to believe that this surplus will be larger in future years. To specify, in brief, some of the causes which render this probable:

1. Increase of population, by natural increase, and by emigration from foreign countries. Probably not less than one hundred thousand emigrants yearly leave the shores of Europe, who find their way into the United States. It is true that some of the poorest of these, who have no means of paying the expense of travel into the interior, have been forced, for want of occupation, to return; but by far the greater number continue in this country. Even during the winter months many are arriving, by the way of New Orleans, which port affords peculiar facilities while the more northern routes to the west, by the canals and lakes, are closed. Thus, in a late paper, we find the following notice: "There arrived at St. Louis, on the 8th and 9th instant, 1,417 passengers, principally English and German." Recent mention has likewise been made of a large projected emigration from England and Ireland, and from parts of Germany, which may lead us to anticipate a very considerable increase to the usual annual number.

2. The introduction of labor-saving machines for sowing, reaping, threshing, &c. The increase from this cause is large, and may be expected to be-

come yet more so. It has been estimated that Great Britain employs steam alone for the purpose of effecting what formerly depended on other power equal to 500,000,000 of men, which is as many as one half of the population of the whole globe.

3. The facilities for enclosing the prairies at a more moderate expense, and of constructing cottages at a much less expense. Multitudes will thus no doubt be called out into action, and millions of acres of land be brought under tillage, and, rich as they are in soil and ease of cultivation, the increase of the annual crop will be very large. Where the laborer can be comfortably lodged and sheltered, his effective strength is put forth with more vigor, and the inducements to employ his energies are far greater.

4. The encouragement to fell the forest, and clear up lands by converting the growth into pot and pearl ashes, as well as to raise corn, &c., for the purposes of manufacturing sugar, the preparation of pork, lard, &c., for market.

5. The withdrawal of laborers from public works which have been stayed in their progress by the indebtedness of the States, and the failure of those engaged in prosecuting them. If the plan of railroads by associated labor, above mentioned, shall be found to answer the purpose, this cause may not, perhaps exercise so great an influence in lessening the quantity of products raised.

6. The poor encouragement in trade, and the appalling number of failures among men of business in the commercial cities, &c., will doubtless throw out a vast number of consumers of various descriptions into the class of laborers and producers of agricultural products.

These principal causes, together with others of less influence which might be added, will probably contribute to increase the number of tillers of the soil, while every additional laborer from a consumer becomes likewise a producer to no small amount.

COMPARISON OF EXPORTS AND IMPORTS.

While the present surplus of agricultural products, with the prospect of their increase, brings such discouragement, unless some market can be opened beyond the present demand, it is pleasant to discover the means of relief by a diversion of labor in producing articles which we annually import to the amount of $45,238,214. The following items are taken from the imports for the average year, so called, of 1838, and exhibit a variety of products of various branches of business, in the raising and making of which the people of this country might engage with advantage. Many others, indeed, might be enumerated, by which a saving could be secured of millions of dollars in the United States. Enough, however, is here given to show where some alleviation lies. It is gratifying, also, to observe that by the last report of the Secretary of the Treasury, the exports from the United States for the year ending 30th September, 1842, have exceeded our imports nearly $5,000,000, notwithstanding the great decrease of business, and the very low price of cotton—the principle staple of foreigh export. In 1839 our imports exceeded our exports by more than $41,000,000; the next year (1840) the exports exceeded the imports by $24,000,000; but, taking the four years (1839, 1840, 1841, 1842) together, the imports have exceeded the exports by $18,000,000, or an average of $4,500,000 a year, the whole of which excess, and much more, might be removed by supplying ourselves with the following articles:

Value of certain articles imported in 1838.

Articles.	Amount.	Total.
Silk, manufacture of	$9,454,160	
Silk, sewing	358,178	
		$9,812,338
Silk and worsted goods	–	1,522,272
Cotton manufactures	–	6,599,330
Hemp, unmanufactured	512,506	
Ticklenburgs, osnaburgs, and burlaps	362,725	
Sheetings, brown and white	325,345	
Sail duck	683,070	
Manufactures not specified	47,292	
Cotton bagging	173,325	
Cordage, tarred, and cables	75,142	
Cordage, untarred, and yarn	9,917	
Twine and packthread	88,338	
		2,277,660
Iron and steel, manufactures of	3,069,507	
Iron castings, vessels, and other	69,698	
Nails, spikes, burred iron, sheet, &c.	801,666	
Bar iron	2,991,317	
		6,932,188
Copper, brass, tin, pewter, and lead, manufactures of	–	355,491
Wood, manufactures of	–	199,514
Leather, manufactures of	–	594,648
Glass ware, not specified	310,726	
Demijohns, bottles, and vials	165,047	
Window glass	55,227	
		531,000
Clothing, ready made	–	225,732
Raw silk	–	29,938
Brushes of all kinds	–	27,039
Paper hangings	–	39,988
Indigo	–	363,406
Woollens, flannels, baizes, and carpetings	–	475,332
Wines	–	2,318,282
Oil, olive, linseed, hemp seed, and rape seed	–	286,835
Sugar	–	7,586,825
Cigars, snuff, and other manufactured tobacco	–	846,937
Salt	–	1,028,418
Coal	–	308,591
Steel	–	487,334
Rags	–	465,448
Copper, in bars, &c.	838,916	
Copper sheathing, &c.	551,781	
		1,390,697

VALUE—Continued.

Articles.	Amount.	Total.
Wool, under 8 cents per pound - - -	$445,478	
Wool, over 8 cents per pound - - -	87,493	
		$532,971
		45,238,214

Such being the case with us, it seems very desirable to ascertain what is the prospect of a foreign market; and this must lead us into an examination of the feasibility of shipping our products, so as to enable the agriculturist to obtain what may be deemed a reasonable compensation for his labor. This subject divides itself into two questions:

1. What markets are or may be expected to become open to our produce, or who will take our products if we will furnish them?

2. What is our prospect of success in the competition with other producers in the same market?

MARKETS AT HOME OR ABROAD.

The question how our surplus products shall be disposed of is one of deep interest to the people of this whole country. A *home market*, it must be admitted, is the most sure and important. Still, even a revival or extension of manufactures (it may be for many years to come) probably might not create a demand equal to the loss of consumption of many articles of agricultural export, hitherto purchased from the north and west, required by the southern States. By the census of 1840, it appears that, in 1839, there were 791,749 persons engaged in manufactures. This number, however, is small, compared with the number of those who were consumers in the south, when it was thought more profitable to buy breadstuffs than to raise them, and who are thus withdrawn from the population on whom the great agricultural districts depend for a market. The case is now changed. The low price of cotton compels the planter to raise all he can for the support of his hands. This, it is thought, will be continued, though he may hold on to cotton as the best article for export. Mississippi is a striking instance of the truth of this remark. In 1836, that State was supposed to have purchased from the northwestern States $2,000,000 worth of produce, and is now raising wheat and corn most successfully on the uplands, especially those contiguous to Tennessee, where both flourish so well; and it is stated, on high authority, that soon there will not be needed more than $200,000 worth from out of the State. The surplus produce throughout the whole country is perhaps not so much occasioned by the suspension of the manufactures as by diversion of labor from cotton to the raising of articles of consumption rather than of exportation. Necessity, with her iron grasp, is pinching still closer and closer, and a return even to domestic and household manufactures will, it is believed, to some extent take place. Things are cheap or dear relatively. As the value of money

increases, prices fall. If extravagance and idleness have spoiled many of the rising generation, then that necessity which commands will check the evil. There is, however, nothing discouraging in all this. Our country is fertile, our real wants will be abundantly supplied, while health and happiness will follow laborious occupation. Thousands driven from other countries by a sheer want of food will constantly press hither for a better home. Operations to accumulate wealth will be more rare, while moderate competency will crown its possessors with higher blessings than riches can bestow.

The present state of the world deserves consideration. It is a time of general peace between the great European powers, and the last year's crops everywhere, except in France and part of Spain, have been so large that the demand for our surplus products is small. And while the home demand is so inadequate we must create a domestic market to a much greater extent, or seek a foreign one with all its fluctuations, and consent to such reduction of wages as will enable us to compete with pauper labor abroad. A reduction to meet the emergency will not fall alone on the laborer. Food constitutes his greatest expense, and this he must and will have. On the proprietor, then, the loss will be more serious and abiding.

PROSPECT OF A FOREIGN MARKET.

Let us, then, look at the prospect of finding a foreign market for our surplus. In the consideration of this subject, we may inquire what market may be found to consume our exports? It is true the present is a remarkable period. With the European world at peace, little diversion there from agriculture can be expected. The crops of England, Holland, Ireland, and most of the grain-growing countries on the continent, are large. But such a state of things may possibly not soon again occur; either war may rage, and occasion a demand for supplies, or a practical failure of the crops may create a scarcity. If we examine this question of a foreign market somewhat more closely, we may, perhaps, discover encouragement. England can not much longer depend on her own supply, even with good crops. The truth of this assertion may be easily shown. Professor Johnstone, in his recent work on agricultural chymistry, thus alludes to the condition of England in this point of view:

"The superficial area of Great Britain comprises about fifty-seven millions of acres, of which thirty-four millions are in cultivation, about thirteen millions are incapable of culture, and the remaining ten millions are waste land, susceptible of improvement. The present population, thereto, is supported by the produce of thirty-four millions of acres; or every thirty-four acres raise food for about twenty people. Suppose the ten millions of acres which are susceptible of improvement to be brought into such a state of culture as to maintain an equal proportion—the most favorable supposition—they would raise food for an additional population of about six millions, or would keep Great Britain, independent of any large and constant foreign supply, till the number of inhabitants amounted to twenty-six millions. But, at the present rate of increase, this will take place in about twenty years; so that, by 1860, unless some general improvement take place in the country, the demands of the population will have completely overtaken the productive powers of the land."

How vastly different in this respect, is our own country. We have breadstuffs already above our own consumption, enough to feed many millions. And we differ also from England in this respect: that our unoccupied lands are in a much greater proportion susceptible of cultivation. When the vacant land in the United States is improved, even to the extent of the present culture, we shall be able to sustain three hundred millions of population. Even the thirty-nine millions of acres of prairie heretofore mentioned, allowing twenty bushels of wheat to an acre, would produce seven hundred and eighty millions of bushels, which would be six and a half times more than the whole wheat crop by estimate for 1842.

Shipments of some articles to England by direct trade, even under the present British tariff, may be made with advantage. Soon, however, it is believed that exports will go through the Canadas at a still lower tariff. As this subject is one of deep interest to the United States, much attention has been devoted to it in connexion with these remarks. The following table exhibits the present (Sir Robert Peel's) tariff of articles from the colonies and from the United States direct:

The British tariff.

Articles.	Of or from British possessions.		Foreign produce.	
	s. d.	ct. m.	s. d.	ct. m.
Bacon, per cwt.	3 6	about ½ 0 per pound	14 0	about 2 0 per pound.
Beef salted, not being corned beef, per cwt.	2 0	about 0 4 per pound	8 0	about ½ 0 per pound.
Tongues, per cwt.	2 6	about ½ 0 per pound	10 0	about 2 0 per pound.
Butter, per cwt.	5 0	about 1 0 per pound	20 0	nearly 4 0 per pound.
Cheese, per cwt.	2 6	about ½ 0 per pound	10 6	a little o. 2 0 per pound.
Eggs, per 120	0 2½	not quite 1 0 for 2 dozen	0 10	about 2¾ per dozen.
Ham of all kinds, per cwt.	3 6	nearly ¾ 0 per pound	14 0	about 2¾ per pound.
Lard, per cwt.	0 6	not 0 1 per pound	2 0	about 0 4 per pound.
Pork salted, not ham, per cwt.	2 0	about 0 4 per pound	14 0	about 2¾ per pound.
Cranberries, per gallon	–	–	0 1	about 15 0 per bushel.
Pot or pearl ashes	Free	-	0 6	when for home cons'n.
Oil seed cakes, per ton	–	–	1 0	or 22 cents.
Linseed, per cwt.	–	–	0 1	or 1¾ cents.
Rapeseed, per cwt.	–	–	0 1	or 1¾ cents.
Beeswax, per cwt.	2 0	or 44 0 -	1 0	or 22 cents.
Stearin candles	–	–	0 2½	or about 4 cents.
Tallow, per cwt.	3 2	nearly ¾ 0 per pound	0 3	or about 5½ cents.
Castor oil	1 3	¼ 0 per pound.		

Wheat, of foreign production, according to the sliding scale, reduced to federal money.

Price per bushel.	Duty pr. bushel.
Under $1 53 - - - - -	60 cents.
$1 53 and under $1 56 - - - -	57 cents.
1 56 and under 1 65 - - - -	54 cents.
1 65 and under 1 68 - - - -	51 cents.
1 68 and under 1 71 - - - -	48 cents.
1 71 and under 1 74 - - - -	45 cents.
1 74 and under 1 77 - - - -	42 cents.
1 77 and under 1 80 - - - -	39 cents.
1 80 and under 1 83 - - - -	36 cents.
1 83 and under 1 86 - - - -	33 cents.
1 86 and under 1 89 - - - -	30 cents.
1 89 and under 1 92 - - - -	27 cents.
1 92 and under 1 95 - - - -	24 cents.
1 95 and under 1 98 - - - -	21 cents.
1 98 and under 2 07 - - - -	18 cents.
2 07 and under 2 10 - - - -	15 cents.
2 10 and under 2 13 - - - -	12 cents.
2 13 and under 2 16 - - - -	9 cents.
2 16 and under 2 19 - - - -	6 cents.
2 19 and over - - - - -	3 cents.

Wheat meal, and flour, for every barrel of 196 pounds, a duty equal to that on 38½ gallons of wheat.

Wheat, &c., from British possessions, &c.

Articles.	Price per bushel.	Duty per bushel
Wheat - - -	Under $1 51 - -	Nearly 15 cents.
	From 1 51 to $1 54 -	10 cents.
	From 1 54 to 1 57 -	8¾ cents.
	From 1 57 to 1 59¾ -	5½ cents.
	From 1 59¾ and upward -	3¾ cents.
Barley - -	Under 77 - -	About 7 cents.
	87 and upward -	2 cents.
Foreign - -	Under 71½ - -	About 30 cents.
	About 1 02 and upward -	About 2½ cents.
Oats - - -	Under 65½ - -	About 5 cents.
	63¼ and upward -	1½ cents.
Foreign - - -	Under 51¼ - -	22 cents.
	74½ and upward -	3 cents.
Rye, peas, and beans - -	Under 82½ - -	8 cents.
	88½ and upward -	1½ cents.

Wheat meal, and flour, for every barrel of 196 pounds, a duty equal to that on 38½ gallons of wheat.

From high authority we learn that "Canadian wheat has been subject to a duty from England varying from 6*d.* per quarter up to 5*s*., and flour in proportion; and, although the shipper of wheat has been compelled to furnish a certificate of its colonial origin, the flour ground from American wheat has gone from Canada, as colonial, at the low rate of duty; and hence the large trade which has of late years sprung up between Canada and the western States, with so much advantage to both, but *particularly the latter.* The colonists have been incessantly urging the demand on the mother country for free admission of their breadstuffs, but have been denied this boon, on the ground that such an arrangement would enable Americans to send in their grain free *from all duty;* but they have been led to believe that, in case they impose a duty on American wheat, theirs will thus be admitted into England *duty free.* Accordingly, last session of the Canadian Parliament a duty of 3*s.* sterling per imperial quarter, or 4½*d.* sterling per imperial bushel, was imposed by the Canadian Parliament; which act was reserved for the assent of the imperial government, it being understood that unless the latter admit Canadian grain free of duty, the act will not take effect." "The Canadian millers and merchants have advocated the free admission of American products, while the agriculturists, who return a large majority of the representatives in Parliament, have protested against it."

If the new law enacted by the Canadian Government goes into operation, as is expected, in July next, the following will be the duties charged on American produce landed at Liverpool in British vessels: "With regard to provisions, a duty of 3*s.* per cwt. has been imposed on salted meat, 8*s.* on butter, 5*s.* on cheese, and 2*s.* per barrel on flour, by an act of the Parliament, to take effect next July. The provincial parliament will probably impose duties on fresh meat, on cattle, and all sorts of grain. These duties, however, will be small."

According to a statement of duties payable on articles of produce of the United States into the Canadas, the following articles pay an additional duty of 5 per cent., imposed by the provincial states, besides the duty laid by Sir Robert Peel's tariff: pot or pearl ashes, flax, hemp, hams, bacon, hay, hides, and meal. Among the articles at present admitted in the Canadas free are beef, Indian corn, grain of all kinds, flour, and pork. Lard is subject to a provincial duty of 15 per cent. ad valorem; molasses 1*d.* sterling per gallon, and 4*s.* and 6*d.* per cwt.; sirups 1*d.* sterling per gallon, and 1*s.* 6*d.* per cwt. These duties are all paid in sterling money, at the rate of 4*s.* 4*d.* the dollar, and equal to 5*s.* 1*d.*, Canada currency, or nearly 102 cents. The imperial duties are levied on the amount of the invoice cost in the United States, and adding thereto 10 per cent. For instance, should the amount of the invoice be £100, the duty is charged on £110. The provincial duties are charged on the amount of invoice without the additional 10 per cent. As these subjects are of much importance to those who can avail themselves of any opening for their produce into the Canadas, the provincial tariff now in force, as published by a firm in St. John's, for the information of those with whom they trade, and also a letter from William Macrae, collector at St. John's, to the collector of Burlington, Vermont, describing the change proposed in the provincial regulations, &c., are added. They may be found in the appendix (Nos. 16 and 17).

This new channel of trade will doubtless make quite a diversion from the canals leading to our seaports, but from these seaports there will be

better markets from the middle and southern States. Some judgment may be formed as to this trade from the fact that there were transported through the Welland canal from the United States to Canadian ports—

Articles.	In 1840.	In 1841.
Flour - - - -	186,864 bbls.	193,137 bbls.
Beef and pork - - -	14,389 bbls.	24,195 bbls.
Wheat - - - -	1,720,659 bush.	1,212,458 bush.
Corn - - - -	27,085 bush.	90,158 bush.

The amount of products for the past year exported to Canada from Cleveland is estimated at $1,016,796.

The following are some of the articles mentioned :

Articles.	Quantity.	Value.
Wheat - - - -	380,684 bush.	$319,177
Flour - - - -	94,248 bbls.	382,729
Corn - - - -	59,670 bush.	19,393
Brooms - - - -	1,475 doz.	1,721
Beef - - - -	1,384 bbls.	8,667
Lard - - - -	178 bbls.	1,656
Pork - - - -	44,750 bbls.	260,049
Clover seed - - -	11 lbs.	132
Oats - - - -	2,200 bush.	500
Tallow - - - -	107 bbls.	1,480
Hams - - - -	72,106 lbs.	8,625
Staves - - - -	92,000	2,355
Rye - - - -	1,453 bush.	726
Cheese - - - -	23,163 lbs.	1,015
Broomcorn - - -	6,000 lbs.	300
Butter - - - -	1,595 lbs.	122

From the above, it will be seen that there must be an increase in this colonial trade from year to year.

The inquiry may arise, Will England accede to the request of the Canadian Parliament, who ask that produce shipped from these provinces, having paid a certain duty, may be admitted into England without duty? From the best opinion that can be formed from our Canadian correspondence, there can be little doubt that the experiment will go into operation. The reasons which lead to this conclusion are the following: In this trade England benefits her colonies by the duty. She can thus supply her poor at home, without any further modification of her corn laws, and she can secure to her own commerce the carrying trade, and also the grinding of large quantities of wheat in Canada. These are weighty motives. She

also has a desire to increase, as she may thus do, the trade with her best customer, the United States; and this will aid in the accomplishment of such a plan. It may be asked here what effect this new trade will have. To determine this point, the following statement is presented of the price in England of some of the leading articles to authorize the trade. The cost of shipment charges and the result will show the value of the goods at the port of the shipment from the United States. The widening of the Welland canal, which connects Lake Erie and Lake Ontario, and the late experiment of a ship-channel round the rapids of the St. Lawrence, open a direct communication from Sandusky, on Lake Erie, with Liverpool, hence freights will probably be very low. It may be remarked here, in passing, that the inspection laws of the State of New York are said to be so greatly at variance with the mode in which provisions must be packed for the English market, that unless some alteration takes place, this circumstance will prove injurious to our trade in this respect.

The mode in which provisions should be prepared for the English market is subjoined in Appendix No. 18, from a description published for the benefit of those who are engaged in this business.

As shipments will also be made to other parts of Europe besides England, the freight to Liverpool and Havre, from New York, and New Orleans, or Boston, are also included in the following table:

Price of articles in England: lard, 38*s.* to 43*s.* per cwt; equal to $8 36 to $9 36.

Cost of shipment or freight from Cleveland to Montreal, 47½ cents per hundred.

Cost from Montreal to Liverpool, about 70 cents per hundred.

Cost to New Orleans from Cincinnati, 75 to 87 cents per barrel.

From New Orleans to New York, 75 cents per barrel.

From Cleveland to New York, 55 cents per hundred pounds.

From New York to Liverpool, 33 cents per hundred pounds.

From Cleveland to Boston, 60 cents per hundred pounds.

From Boston to Liverpool, 38½ cents per hundred.

From New Orleans to Liverpool, 50 cents per hundred pounds.

It may be interesting to ascertain also the advantage of shipping a leading article on which the colonial duty is nominal by the Erie canal and New York, or by the Welland canal and Montreal, viz:

Freight per 112 pounds on lard from Cleveland to Montreal -	50
Montreal to Liverpool - - - - - -	70
Colonial duty on importation in Canada 15 per cent. ad valorem -	90
Duty on this colonial produce in England - - - -	11
	$2 21
From Cleveland to New York - - - - -	55
New York to Liverpool - - - - - -	33
Duty on foreign produce by Sir Robert Peel's tariff - -	44
	$1 32

Being 89 cents in favor of the New York route.

The question may be asked, what will wheat be worth, in the Western States, to manufacture flour for the British market, if the same is admitted via Canada at 3*s.* per quarter, equal to 44 cents per barrel? Wheat, at

Lafayette, Indiana, which must be transported by canal to Lake Erie, 230 miles, is taken as an instance.

The price in England is now 27*s.*, equal to - - -	$5 94
Cost of wheat, for a barrel, 4¾ bushels at 50 cents - - -	$2 37
Barrel and manufacturing with offal - - - -	50
Freight to Lake Erie - - - - - -	62½
From Lake Erie to Montreal - - - - -	85
From Montreal to Liverpool - - - - -	80
Duty at Liverpool, if ground in the Canadas - - -	44
	5 58½
The exchange on England is worth 7 per cent., say - -	$0 40
The whole surplus is allowed as surplus for contingencies and commissions - - - - - - - -	36
	76

It may not be unacceptable to the producer to learn the value of his commodity in the market of exportation.

A New Orleans price current of January 7, 1843, quotes lard at 6¼ cents, and hams at 7 cents. The question arises, what is pork worth to the farmer on the western waters, where the shipment to New Orleans is estimated at 75 cents per barrel?

A fat hog, weighing 300 pounds, will furnish two hams weighing together about 42 pounds, leaving 258 pounds of pork. If this is reduced to lard by the most expeditious and profitable manner, viz.: by steaming, we may expect about 60 per cent. of lard, equal to 154$\frac{8}{10}\frac{0}{0}$ pounds, which,

at 6¼ cents, amounts to - - - - - -		$10 67
Add 42 pounds of hams, at 7 cents - - -	$2 94	
Deduct shrinking and curing - - - -	94	
		2 00
		12 67
Deduct keg or barrel - - - - -	75	
Also freight to New Orleans - - - -	75	
Commissions and contingencies - - - -	67	
		2 17
		10 50

This gives $3 50 per hundred for the hog as dressed.

Lard, if shipped to Liverpool, will afford a greater profit, as will appear by reference to the table of cost of shipment to Liverpool from New Orleans, above given.

As such a comparison may be of use to some, a *pro forma* bill of lard or tallow shipped from New York to Havre, covering the whole cost and charges reduced to federal money, is added, by which it will be seen that this article will bear transportation.

Sale of 100 *casks of tallow at Havre.*

Articles, &c.		Amount.	Total.	Aggregate.
		Pounds.		
100 casks, weighing, gross kilog's	40,625	91,406		
Tare - - - -	4,875	10,968½		
Total kilogrammes - -	35,750	80,437½		
		at $10 45		
Charges.		per lb.	–	$8,333 37½
Insurance on $7,218 75, at 1 per cent. -		$72 18¾		
Brokerage - - - -		7 45¼		
			$79 64	
Freight on 59,580 pounds, at ½ per cent. -		447 90		
Primage, at 5 per cent. - - -		22 40		
			470 30	
Share in the unloading expenses - -		—	9 37½	
Duty on gross pounds, $91,406 93⅜; for 112 pounds, $761 72; 10th and stamps, $76 22; (discount, 1⅓ per cent.) -		—	827 79½	
Cartage and warehouse, receiving and delivering - - - -		—	32 81½	
Sampling, coopering, and taring - -		—	18 75	
Brokerage, at ¼ per cent. - -		—	21 12	
Warehouse rent, at 50 cents per cask per month, and fire insurance - -		—	17 82	
Postage and petty charges - -		—	5 81	
Guarantee - - - -		—	42 23	
				1,525 65½
				6,807 72

While England will, no doubt, receive most of our importations (should the price of freight and duties permit), as France and Spain are reported to have short crops, and consume some of our articles of export, they may afford us a fair field of operation.

SUCCESS OF COMPETITION.

Another question is also one of deep interest to us. Were England to open her ports to us, or so to modify her tariff that our surplus produce might be shipped to her ports, could we compete with other and nearer producers? The fear has been often expressed, that, were the ports of England open, markets nearer than the United States, on the continent, would compete with us successfully. Such would naturally be the conclusion (when we reflect that steamers sail in two days from Hamburg to London), had not a very minute examination been made, by direction of high authority, into the ability of the continent, &c., to supply Great Britain with breadstuffs.

The subject of her future supply has long been one of deep interest to that country, as bearing so directly on her corn laws; and extensive investigations have been ordered, and much information obtained. Lord Palmers-

ton, in June, 1810, addressed a number of queries to her majesty's consuls at St. Petersburg, Riga, Liebau, Warsaw, Odessa, Dantzic, Stockholm, Konigsburg, Stettin, Memel, Elsinore, Hamburg, Rotterdam, Antwerp, and Palermo, embracing the points connected with all the grain-growing countries of Europe; and written answers were required as to the quantity of grain which would be exported if the corn-trade were open at a moderate duty; the average prices, the freight, &c.; and the probability of the increase of crop, &c. In answer to these inquiries, a minute detail of facts shows that little reliance can be placed on the continent for a supply. The soil contiguous to the sea ports has already beenextensively tilled, and can not be pushed further without the aid of artificial manures, while the bad roads from the interior shut them out from a competition with us.

Thus in Russia: The corn districts are too remote from the seaports for the grain to be ready in season for exportation; the rapid increase of manufactures has withdrawn from tillage, &c.

In Poland there is a deficiency of manure, and scarcity of hands, and want of skill in cultivation.

From Odessa, the report is, that the crops are precarious, on account of drought; tillage is defective, and improvement difficult; distances great; no roads; the rivers unnavigable; the landholders impoverished, and no improvements to be expected.

The following is the result, imbodied in a table by Mr. Curtis, who has lectured on the corn laws in England, and which is taken, in part, from Mr. Leavitt's memorial, published for the use of the Senate, by an act of July 1, 1842—a document containing much valuable information.

Answers from	What quantity of wheat might be exported to England.	Average price of wheat	Whether the quantity produced would be materially increased.	Freight per quarter.	Cost, per bushel, on board of vessels at Liverpool.
	Quarters.	*s. d. s. d.*	*Answers.*	*s. d. s. d.*	*Dols. cts.*
St. Petersburg.	192,500	39 1 to ——	No.....	4 5 to 5 0	0 93¼
Riga.....	.....	49 7 to ——	No.....	4 9 to ——	1 50
Liebau.....	30,000	43 7 to ——	No.....	4 6 to 5 0	1 3¾
Odessa.....	150,000	26 6 to ——	No.....	10 0 to ——	1 00
Warsaw.....	300,000	36 0 to ——	To a certain extent—say....	.....	1 42
Stockholm....	1,000	30 0 to 35 0	Yes, if foreign capital were employed.....	3 6 to 4 0	0 99
Dantzic.....	315,000	40 0 to ——	No.....	3 6 to 4 0	1 19¼
Konigsburg...	65,000	40 0 to 45 0	No.....	4 0 to 6 0	1 30½
Stettin	250,000	40 0 to ——	No.....	4 0 to 5 0	1 22
Memel.....	5,964	35 0 to ——	Might be increased one fourth if there were a great demand	4 0 to 5 0	1 08¼
Elsinore.....	175,000	30 0 to 36 0	Yes.....	3 6 to 5 0	1 02
Hamburg.....	538,000	35 0 to 46 0	Probably not.....	2 6 to 5 0	1 21½
Rotterdam....	.....	55 0 to ——	To no great extent.....	2 0 to 2 6	1 57
Antwerp.....	.....	56 5 to ——	No.....	2 0 to 2 6	1 61½
Palermo.....	200,000	38 0 to ——	Would increase in three or four years.....	8 3 to ——	1 27
Total.....	2,222,464				
Gen'l average.	.....	40*s.* 6*d.*	.....	4*s.* 9½*d.*	1 24½

It may also be gratifying to some to compare the transportation of flour, &c., from Poland (one of the greatest grain-growing districts) and the United States, to England.

From Poland to Dantzic, the grain is chiefly brought from the interior in flatboats of the rudest construction, similar to those in use on the western waters of the United States, at an expense of 25 cents per bushel, open to the weather, &c. During the voyage the wheat sprouts, and forms a thick mat or covering for the bulk. On reaching Dantzic, the boat is broken up and sold, the wheat taken out and dried in the fields, then stored in the warehouses, at an expense of 6 cents per bushel. From Dantzic to England the freight, &c., not including the duty, is nearly 8*d.*—equal to about 15 cents per bushel; making in all about 46 cents per bushel. From Illinois to Liverpool the whole freight would be 14*s.* per quarter, or 1*s.* 9*d.*—equal to 38 cents per bushel: being about 8 cents in favor of Illinois. There are costs and charges also, in both cases, which would probably be in favor of our export.

In this connexion, it may be interesting to compare a detailed estimate of the exports of wheat from Illinois to England, both by New Orleans and Canada.

Illinois wheat, via New Orleans to Liverpool.

Wheat, 4¾ bushels, at 50 cents, is - - - -	$2 37
Grinding and barreling (with offal) - - - -	50
Freight to New Orleans - - - - -	62
Freight to Liverpool - - - - - -	66
	4 15

Which is little less than 90 cents. Charges would be alike in both cases.

View the matter in another point of light. Suppose we carry our grain or flour through Canada, and pay, after the 5th July, 3*s.* on an imperial quarter, viz: 8 bushels, which is about 8⅓ cents per bushel; foreign wheat would have to pay, at the present sliding rule, about 60 *cents* per bushel. Could they compete with us?

We therefore could succeed with the greatest competitor; but that competitor can not supply 1,500,000 bushels, less than the surplus of some of the smaller States of this Union produce; and, indeed, all Europe could not supply England with more than 18,000,000 bushels, under the most favorable circumstances—about three fourths as much as the State of Ohio now furnishes.

It may be remarked, too, that the crops on the continent are far more precarious than those of the United States; and hence, the continental Governments find it necessary, and are careful to reserve large granaries, to guard against such a misfortune as a failure of the usual harvest. Exportation thence is also forbidden in certain cases, but in the United States no such prohibition exists.

While, therefore, we may look with confidence to advantages in our favor in the British market, we must remember that we have to compete against almost unpaid labor, and can not expect a great profit on our culture unless the very cheapest mode of production is studied. Labor (as we have before

remarked) must doubtless fall very considerably in agricultural districts, or else farmers and planters can not hire.

That such is the case appears from the fact, that already it has been announced in the papers of the day that a reduction is contemplated in Maryland and elsewhere. Nor is this fall in the price of labor to be much regretted, if the wants of the increasing population can be as well supplied by the present low wages, as those of former years by the wages then obtained. Food has usually constituted the great expense of the poor. The reduction of an inflated currency must of necessity be attended with the corresponding reduction in the price of labor and the value of property.

The change is evidently better for the people in the end; and though the transition from the fancied prosperous days of speculation, caused by a spurious currency, may deeply affect those who are indebted, a regular healthy trade, formed upon a currency based upon specie, will certainly be most desirable, and to none more so than to the yeomanry of our country, who toil in great honesty and industry to sustain society, and depend on sage legislatures to make wise and safe laws to protect their hard-earned gains.

PROBABLE MODIFICATION OF THE CORN LAWS.

A further inquiry is here suggested. The supposition has been made above that England will materially change or even repeal her corn laws. This question has been examined, and the result is, that there is much to fortify the conjecture that such must eventually be the result. Her population is increasing. The uncultivated lands are continually becoming less in proportion. What is tilled is much of it carried to the highest point of cultivation. If she would avail herself of her advantages of extent of territory, and new acquisitions as a mart for her exported manufactures, she can not spare many from that branch of industry to agriculture. The sufferings of the poor, and the burden of her poor laws, are very great. A steady advance has been made for some years toward this result. The Manchester Chamber of Commerce, comprising the most eminent merchants and manufacturers, after a debate of ten hours, at two sittings, have declared, by a vote of six to one, that, *unless the corn laws are immediately abolished*, the destruction of their manufactures is inevitable. The information the people have received of our vast surplus product has urged them forward, as they see thus the means of supply within reach.

It has been ascertained, by an eminent English baker, that the American flour, either in biscuit or bread, will absorb from $\frac{1}{13}$ to $\frac{1}{7}$ more of its weight in water than any other flour. It is also stated, that 14 lbs. American flour will make 21½ lbs. of bread, while the best kind of English flour will produce but 18½ lbs. About one crop in seven, in England (some say a less number), is a failure. The London Mark Lane Express estimates the total average product of the United Kingdom at 320,000,000 bushels, and that the crop of 1841 fell short at least 86,000,000 bushels. Every diminution of any considerable amount must be supplied from abroad. The present sliding scale of duties prevents the American importer from availing himself, as much as he would do, of his information, and sending out cargoes, even when the price is such as to render it profitable; for, before his ship reaches the port, the duty may rise so high as to make it a dead loss. In 1841, when the imports of wheat into England were 21,-

604,840 bushels, the whole amount from the United States was 2,528,600 bushels; in 1840, when the whole import of wheat was 18,502,120 bushels, the United States sent out 6,831,000 bushels. The yearly consumption of all kinds of grain in Great Britain is estimated at 52,000,000 quarters, or 416,000,000 bushels, of which wheat is about 104,000,000 bushels. This probably would be much increased, were bread to be brought down to a low price. The quantity of wheat imported into Great Britain from Ireland, in 1832, was 552,720 quarters; in 1839, but 90,600 quarters; and, owing to the temperance reformation, by which the consumption of food will be increased, this will probably be still more lessened.

From the English Farmers' Journal, which we quote here in substance, it appears that, on the day fixed for the payment of reduced duties on salted provisions, public sales were announced to take place on the following day; which sales comprised 1,512 barrels of American beef, 2,199 barrels of American pork, 321 barrels of American hams, 691 barrels of Canadian pork, and 35 barrels of Canadian beef. There was a numerous attendance of town and country dealers, also gentlemen from Ireland, to watch the progress of a trade threatening to interfere with their trade so long exclusively enjoyed. The United States meats was imported months before, and cured before it was known that there would be a change in duties, and therefore not so well suited to the taste of consumers as it may hereafter be. The meat was well fed, but fatter than the usual Irish. The beef was not so well fed. The hams sold at 30*s.* 6*d.* to 31 per cent., duty paid, equal to about 6 cents per pound; prime beef sold at 38*s.* to 39*s.* per barrel, duty paid, about 4½ cents per pound; pork went at from 41*s.* to 46*s.* per barrel, duty paid, equal to about 7½ cents per pound; the Canadian pork realized 43*s.* to 46*s.* per barrel, duty paid, &c. From the most recent account, it would appear that American provisions are in some demand; and if our countrymen will adopt the English methods of curing and packing, so as to suit the taste of the foreign purchaser of their articles of export, there seems little reason to doubt that a considerable trade might be carried on. Much complaint is made of the mode of preparation, and hence attention to this is the more necessary to compete with the Irish producers. The quantity of our flour exports, it is said, depends greatly on the price in the home market. Thus it is said that in 1834, a year of abundance in England, when the price of flour was $5 45, there were exported 835,352 barrels, nearly as much as in 1839, in which there was a short crop in England; and when flour was $7 56 in our market, when the export amounted to 1,897,501 barrels of flour, at $5 37. On examination, also, it appears that for twelve years, from 1829 to 1840, more than one half the whole imports paid an average duty of about 6 cents per bushel. Taking twelve years together, from 1828 to 1839, it appears that Great Britain had raised sufficient for her own supply only four years out of twelve; in two out of three she has found it necessary to import, varying from 2½ to 20 per cent. of her whole consumption. A considerable portion of land, better fitted for grazing, has been forced into cultivation for wheat by the high prices it has commanded there

The following table, taken from a list of prices in the Farmers' Magazine, gives the highest and lowest prices per quarter of wheat; also, the months of each, with the average of each year, from 1834 *to* 1840.

	1834.	1835.	1836.	1837.	1838.	1839.	1840.
	January.	August.	December.	January.	December.	February.	September.
Highest - -	49s. 10d., or about $1 37 per bushel.	42s. 10d., or $1 39½ per bushel.	60s. 3d., or $1 65½ per bushel.	60s., or $1 65 per bushel	72s. 5d., or $1 99 per bushel	79s. 8d., or $2 19 per bushel.	72s. 3d., or $1 99¾ per bushel.
	November.	December.	January.	December.	January.	November.	December.
Lowest - -	41s. 8d., or about $1 15 per bushel.	36s. 8d., or $1 01 per bushel.	36s. 5d., or $1 per bushel.	52s. 6d., or $1 44 per bushel.	52s. 10d., or $1 45 per bushel.	66s. 11d., or $1 84 per bushel	66s. 3d., or $1 83 per bushel.
Average - -	45s. 3d., or $1 26½ per bushel.	38s. 11d., or $1 20 per bushel.	48s. 4d., or $1 32⅓ per bushel.	56s. 3d., or $1 54¼ per bushel.	62s. 7d , or $1 72 per bushel.	73s. 3d., or $2 01 per bushel.	69s. 3d., or $1 91 per bushel.

Thus it appears that, out of the whole seven, the highest price was in a winter month, except two years, when it was in August and September; also, that the lowest price, for five years, was in a winter month—in the other two years in the month immediately preceding a winter one. It also appears that the average has been almost constantly rising, except for the year 1840. The price of flour, it is said, from Dantzic, delivered at London, could not be less than $7 per barrel, without duty. Such are the facts with respect to England, and her dependance on other countries for her breadstuffs.

The case is similar in France. When the crop, which at an ordinary rate will just about supply her population, fails, great distress ensues, and of necessity they must look abroad for a supply.

Since, then, we must either have a home or a foreign market for our surplus, we are driven to the necessity of so far upholding our own manufactures, and creating a greatly increased consumption, or we must seek to extend our foreign market. The discriminating duties, imposed by Great Britain in favor of the intercolonial trade in her own vessels, will continue to operate against the best competitors in foreign markets with our agricultural products, till the United States herself makes a new conventional arrangement based on terms of fuller reciprocity. In the meantime, however, it is a matter of no small gratification that an outlet can be had through the British American provinces for several articles. Indeed, so strong is the desire manifested by the commissioners in the mother-country, that the laws are construed in the most liberal manner. Thus, while the south has long enjoyed the privilege of sending out her principal staple duty free, in consequence of the desire of the British manufactures to obtain it, so now it seems probable that the other agriculturists of our country, in the north and west, may be enabled to forward their wheat and other produce through the colonies at a comparatively low rate of duty.

From many countries we are nationally excluded by prohibitory duties. Spain, for instance, levies $10 on a barrel of flour in Cuba. From Malaga, where our imports exceed our exports seven times, we are almost shut out. The list might be extended, but it is unnecessary. Could more reciprocal duties be established, a new and lasting impulse would be given to the agricultural industry of the United States. The advocates of home industry and free trade unite in the propriety of fair reciprocal arrangements, if conventional treaties are formed. Many, with long-delayed hopes, are almost ready to despair; some fear an abandonment of present encouragement as incidentally given to home industry by the revenue system. While aiming to avoid the discussion of any political topics, or the protective tariff, yet it seems not entirely proper to withhold any consoling remark which saves the downcast agriculturist from absolute despondency. Reason and philosophy may enable him to endure the present, if sure no worse is to be dreaded.

The following cheering voice is heard from the south side of the Potomac. After expressing a preference for free trade, if it were practicable, it is said: "But we shall regard it as the height of folly to throw open our ports without restriction to other nations, so long as theirs are shut in our faces, and they continue to act upon a wholly opposite policy. The practical statesman, under such circumstances, must lay his abstract philosophy on the shelf, and work out his problems upon the actual theatre of human affairs. To buy in the cheapest market is a very plausible doc-

trine, but to him who is forced to sell in the cheapest market in order to reach it, the delusion is at once manifest. The great problem is, what constitutes, under all circumstances of selling as well as buying, in time to come as well as in time present, the most advantageous market to the consumer."

The halcyon days of free trade, predicted by some, ought not to change efforts made with reference to the commercial policy of the world. Some new difficulties must be met, and some changes made, to accommodate ourselves to existing circumstances. The reduction of the currency and the scarcity of money will, of necessity, reduce wages. Self-denial will take the place of self-gratification, and all possible economy will be studied. Proprietors of land and other productive property will rent on shares in preference to hiring for cash. All possible diversions of labor, too, will be made from pursuits which will produce a surplus which can not find a market; and, whatever may be the abstract theories of burdens on the producer or the consumer, or what degree of protection amounts to prohibition, we may expect ere long an improved domestic market. A demand abroad of a few hundred thousand bushels of breadstuffs is heralded as a happy event, but what comparison, after all, will it bear to the million of consumers created by the diversion of labor from present agricultural pursuits, or manufacturing those articles which are more to us than the produce of foreign labor. Let us listen to the wisdom of those whose opinions are recorded for our encouragement—more especially since such opinions come from individuals who do not sanction protection, except such as incidentally arises from the raising of a revenue:

"To be independent for the comforts of life, we must fabricate them ourselves. We must now place the manufacturer by the side of the agriculturist. The grand inquiry now is, shall we make our own comforts, or go without them at the will of a foreign nation? He, therefore, who is now against domestic manufacture must be for reducing us either to dependance on that foreign nation, or to be clothed in skins and to live like wild beasts in dens and caverns. I am not one of those; experience has taught me that manufacturers are now as necessary to our independence as to our comfort."—*Letter of Thomas Jefferson to Benjamin Austin, January*, 1826.

"When our manufactures are grown to a certain perfection, as they soon will be, under the fostering care of Government, the farmer will find a ready market for his surplus produce, and, what is of equal consequence, a certain and cheap supply of all he wants; his prosperity will diffuse itself to every class of the community."—*Speech of Hon. John C. Calhoun on the tariff.*

"I ask, what is the real situation of the agriculturist? Where has the American farmer a market for his surplus produce? Except for cotton, he has neither a foreign nor a home market. Does not this clearly prove, when there is no market at home or abroad, that there is too much labor employed in agriculture? Common sense at once points out the remedy. Take from agriculture 600,000 men, women, and children, and you will at once give a market for more breadstuffs than all Europe now furnishes. In short, we have been too long subject to the policy of British merchants. It is time we should become a little more *Americanized*, and, instead of feeding the paupers and laborers of England, feed our own; or else, in a short

time, by continuing our present policy, we shall all be rendered paupers ourselves."—*A. Jackson to Dr. Coleman, April* 26, 1834.

The present, too, seems the proper time for us to give to this question of the disposal of our immense surplus a thorough, calm, and deliberate investigation. On the decision of it the prosperity of this great country depends. It has been well said, that "to encourage the progress of agricultural improvement is the only road to national wealth." Our object should not be so much to stimulate to larger production, as to open the ways and means by which the husbandman shall have a market, and shall know how his labor and skill may be most available. For this purpose, he needs a yearly and more full survey of the crops, the markets, and prices, than he can now have. Thousands and millions of dollars are lost to our country by the misemployment of productive industry, from the mere want of information; and, strange as it may appear, our own country, extensive as it is, and devoted as are its population to agriculture, is almost the only one among civilized nations where but little has been done by the national legislature for this great object. England, and France, and Germany, and Russia, watch with deep interest, in their national capacities, over their agricultural prosperity. The farmers and planters are beginning to feel the importance of more regard to their interests, especially in the way of furnishing them with the means of knowledge. The return of the census every ten years is not itself sufficient. It may prove a starting point for each period, and one at which corrections may be made; but, from year to year, there should be imbodied the best results of investigation, carefully and thoroughly conducted. Something has, indeed, been thus attempted, in these agricultural statistics, subjoined to the report of the Commissioner of Patents, and many of our hard-working husbandmen have expressed their sense of the benefit thus derived, and their joy at even this care of their interests by the National Government; but this is not enough, or as much as ought to be done. In the language of one of our best agricultural journals, conducted by one who himself has held a seat in the halls of our National Legislature, and who therefore knows well what comparative neglect this subject has received—

"We want a system of national legislation for this purpose that shall be effectual to collect, periodically, in every State of our Union, and concentrate to one point, at the seat of the national Government, precise, accurate, authentic, and official statistical information upon all the annual results of the husbandman's industry—showing to everybody, at all times, as near as human watchfulness can, upon a scale so extended, all the elements of both the demand and the supply of every article of produce that enters into our markets. With information of this description, published and disseminated through the land by Congress, with only half the profusion that partisan documents are spread by each and every party, an entire revolution in the condition and productiveness of the husbandman's labor would be effected. There would be system, certainty, and confidence, pervading the outlays and the income of the husbandman."

If the length of the review of the crops and accompanying remarks, combined with the various subjects found in the Appendix, seem at first view to be unnecessary, it is believed that the feelings of the whole agricultural community will fully justify the diffusion of a document embracing so much varied information connected with the welfare of our common country.

APPENDIX.

No. 1.

Letter from Hon. John Taliaferro, of Virginia.

WASHINGTON, *January* 16, 1843.

DEAR SIR: I have received the letter which you did me the honor to address to me under date of the 12th instant, and I seize a moment in the hurry of other concerns to reply to it.

1st. You inquire what my experience has been in a species of wheat said to have come to us from the Mediterranean, and known by that name.

2d. What has been the result of the trials of others, in the cultivation of this wheat within my observation.

3d. Whether this wheat resists, effectually, the ravages of the Hessian fly.

4th. What, in my opinion, are the properties of this wheat which enable it to resist, without the least injury, the ravages of an insect so ruinous to every other species of wheat.

I shall answer in the above order of the questions; but before I do so, I will give you the result of my experience and observation as to the periods of the year in which the Hessian fly commits its ravages on wheat, and what the particular injury is at such period. The first attack of the fly is very soon after the wheat germinates, and the maggot will then be found attached to the tender sprout, immediately at or very near the point of vegetation. Hence the *radical* destruction by the fly, in the fall season, not only to large regions of a field, but not unfrequently of entire fields. This is called the fall attack of the fly; and to avoid which, farmers have been driven, by this insignificant insect, to sow wheat at a period of the fall too late to furnish reasonable expectations of a good crop one year in ten; from the 15th of August to the 15th of September is the proper season to sow wheat. The next attack of the fly on wheat commences in the spring, as soon as the weather is sufficiently warm to hatch the egg, and with us in Virginia that occurs about the middle of April, from which time till the middle of May (up to which period the ground joint of wheat, on which the maggot subsists as soon as it is hatched, remains tender and full of juice) the spring injury is done.

In reply to your first inquiry I answer, that I obtained from my friend, the Hon. Arnold Naudain, of Delaware, a specimen of the wheat now known as the Mediterranean wheat. I have raised five crops of it, without the least injury from the fly, and none material from rust; and such has been the invariable result of many trials of this wheat, by individuals to whom I have disposed of it for seed, during the three years past.

The reason why this wheat escapes injury from the fall attack of the fly is, that it *certainly* is so constituted as to possess, and to be sustained by, a more vigorous root than any other known wheat is; so that while the fly in the fall destroys all other wheat known to us, *root and branch*, thus denuding fields more or less, according to season and other circumstances, not a root of this wheat is destroyed, owing no doubt to its energy.

The reason why this wheat escapes the spring attack of the fly, is to be found in the same property—its energy of root—owing to which, or some other unknown cause, its growth in the spring is more rapid and vigorous than any other winter wheat; so that, by the middle of April, it attains a hard and sapless *ground joint*, impenetrable by the then young maggot, which produces the fly; and, if penetrated, furnishing no pabulum (that is, sap); hence the maggots, no matter how many, perish, without doing the least injury to the wheat.

The reason why this wheat is less liable to rust than other winter wheat, is, that it matures from eight to ten days earlier. I have never, till last fall, sowed this wheat earlier than the 15th of September. On the 4th of last September, I sowed five rows in drill, and at the same time I sowed, in juxtaposition, a drill of beautiful and popular white wheat. When I left home, in November, the drill of white wheat was nearly destroyed, *root and branch*, while the Mediterranean wheat was entirely free from injury.

And as I know, for the reasons I have stated above, that it is to sustain no injury in the spring, I look to this wheat to restore to us our true seed time, and thus to exempt the wheat crop from all the maladies necessarily incident to any crop sowed or planted out of season.

I have the honor to be, very respectfully, yours,

JOHN TALIAFERRO.

H. L. Ellsworth, Esq.

No. 2.

Wilmington, *December* 19, 1842.

Dear Sir: Your favor of the 6th instant was duly received. I am sorry I can not give you more definite and satisfactory information in regard to our experiments; but such as I have is at your service. The fact is, that our corn was fully ripe before the least preparation had been made toward manufacturing it; and after this, the delays and breakages incident to new machinery so hindered our progress that a considerable part of our crop was killed by the frost before it could be ground. Yet, the greater part of the crystallized sugar, which I procured the present season, was made from this frost-killed corn. The product was undoubtedly injured, but not to the extent that might have been expected. This fact is important, as it shows the superiority of corn over cane; the latter is totally ruined by frost. The reason of this difference is, that corn becomes more fully matured, and it is, at the same time, a much more hardy plant.

For evaporation, the present season, I had two copper kettles, about two feet deep, capable of holding from 50 to 60 gallons. A charge in these kettles could not possibly be finished in less than ten or twelve hours. This long-continued application of heat caused the sirup to become very dark, and deprived it entirely of the power of crystallization. Seeing this result, I procured a tin vessel (copper would have been better) about two feet long, eighteen inches wide, and six inches deep. In this, evaporation could be completed in about two hours; the sirup was light colored, like honey, and crystallized very well, though not so quickly as would be desirable. This sirup (although so much finer in appearance, compared with that procured

by the first press) is not so agreeable to the taste ; it retains, to a considerable degree, the peculiar flavor of cornstalk.

After crystallization, this taste is entirely confined to the molasses, the sugar not retaining it in any sensible degree. It appears, from my experiments, that this peculiar taste is owing to a certain substance, which may be either driven off or decomposed by the application of heat, if continued for a sufficient length of time ; therefore, after the sugar is separated from the molasses, the latter should be boiled (with the addition of water, if necessary) until the corn taste is entirely removed. The shorter the time which is allowed to elapse, from crushing the stalks to finishing the evaporation, the greater will be the proportion of sugar in the sirup, and vice versa.

Professor Mapes's direction on the subject are excellent, and, if adhered to, will ensure good results. I do not think that any manufacture ever promised better, in the early stages of its introduction, than this has done.

We have every reason for confidence and perseverance, and none at all for despondency; time only is necessary to perfect the details, and settle the business upon a firm foundation.

A revolution in trade will then ensue, vastly important in its effects.

Hoping that we may see all this in our time, I remain yours, respectfully,

WILLIAM WEBB.

H. L. Ellsworth, Esq., *Washington, D. C.*

No. 3.

Remarks on the manufacture of maize sugar, by William Webb, of Wilmington, Delaware.

The most profitable application of labor is a desideratum too frequently overlooked or disregarded by those who attempt the introduction of new manufactures into a country. All calculations of advantage which is to result from the production of any article, must be made with due regard to this point, or practice will prove them to be erroneous.

Fully impressed with this truth, the most rigid examination is invited into everything now offered ; so that, as far as possible, we may arrive at a correct decision respecting the real value of the proposed manufacture. In common with many others, I have felt considerable interest in the plan for extending the cultivation of sugar in temperate climates, and have made many experiments ; first upon the beet, and recently upon maize or Indian corn, in the hope of discovering some mode by which the desired end might be attained.

The results from the latter plant have been extremely encouraging. The manufacture of sugar from it, compared with that from beet, offers many advantages. It is more simple, and less liable to failure. The machinery is less expensive, and the amount of fuel required is less by one half. The quantity of sugar produced on a given space of ground, is greater, beside being of better quality. An examination into the nature and productive powers of these two plants, will show that no other results could have been reasonably expected. It is a well-established fact, that every variety of production found in plants, is derived from the sap. It is also ascertained that

the principal substance found in the sap or juice of many vegetables, is sugar. Therefore, the amount of saccharine matter produced by any plant of this description, may be estimated from an analysis of the fruit, seed, &c., of such plant, when ripe. The grain yielded by corn, and the seed from beet, in the second summer of its growth, are nothing more than this sap or juice elaborated by the process of vegetation, and presented to our view in another form.

Now, as it is contrary to the economy of nature to suppose that there should be any loss of nutritive matter in this change of sap into seed or grain, does it not follow that there must be the same difference in the quantity of sugar produced by the two plants as there is between the nutritive properties of beet seed and corn?

The juice of maize contains sugar, acid, and a gummy mucilaginous matter, which forms the scum. From the experiments of Gay Lussac, Thenard, Kirchoff, and others, it appears that starch, sugar, and gum, are extremely similar in composition, and may be as readily converted into each other, by chymical processes, as they are by the operation of nature. For example: starch boiled in diluted sulphuric acid, for thirty-six hours, is converted into sugar of greater weight than the starch made use of.

This result goes to show that every pound of starch found in the seed of a plant has required for its production at least one pound of sugar, in the form of sap. If it be objected that this deduction is too theoretical to be admitted, it may be answered that experiment, so far as it has gone, has fully attested its correctness.

The raw juice of maize, when cultivated for sugar, marks 10° on the saccharometer; while the average of cane juice (as I am informed), is not higher than 8°, and beet juice not over 3°.

From $9\frac{3}{4}$ quarts (dry measure) of the former, I have obtained 4 pounds 6 ounces of sirup, concentrated to the point suitable for crystallization. The proportion of crystallizable sugar appears to be larger than is obtained from cane juice in Louisiana. This is accounted for by the fact, that our climate ripens corn perfectly, while it but rarely if ever happens that cane is fully matured. In some cases the sirup has crystallized so completely, that less than one sixth part of molasses remained. This, however, only happened after it had stood from one to two months. There is reason to believe, that if the plant were fully ripe, and the process of manufacture perfectly performed, that the sirup might be entirely crystallized without forming any molasses.

This perfection in the manufacture can not, however, be attained with the ordinary apparatus. Without any other means for pressing out the juice than a small hand mill, it is impossible to say how great a quantity of sugar may be prodnced on an acre.

The experiments have been directed more to ascertain the saccharine quality of cornstalk than the amount a given quantity of ground will produce; but the calculations made from trials on a small scale leave no room to doubt that the quantity of sugar will be from 800 to 1,000 pounds. This amount will not appear unreasonable, when it is considered that the juice of corn is as rich as that of cane, and the weight of green produce at least equal.

Mr. Ellsworth, in one of his publications, states, as the result of actual weighing and measuring, that corn, sown broadcast, yielded five pounds of green stalks per square foot; this is at the rate of $108\frac{1}{2}$ tons to the acre.

My attention was first directed to maize as a material for sugar by observing that, in some stalks, the juice was extremely sweet, while in others it was weak and watery. On examination, it appeared that the latter had borne large and perfect ears of grain, while, on the former, these were either small in size or entirely wanting. The natural conclusion from this observation was, that, if the ears were taken off in their embryo state, the whole quantity of saccharine matter produced by the process of vegetation would be preserved in the stalk, from which it might be extracted when the plant was matured. But the idea occurred too late in the season to test it by experiment. A few stalks, however, were found, which, from some cause, had borne no grain; these were bruised with a mallet, and the juice extracted by a lever press. Some lime was then added, and the defecation, evaporation, &c., began and finished in a single vessel. By these simple means, sugar of fair quality was produced, which was sent to the horticultural exhibition of our society in 1840.

I have since been informed, through Mr. Ellsworth, that M. Pallas, of France, had discovered, in 1839, that the saccharine properties of maize were increased by merely taking off the ear in its embryo state. An experiment, however, which I instituted, to determine the value of this plan, resulted in disappointment; the quantity of sugar produced was not large enough to render it an object. The reasons of this failure will be sufficiently obvious on stating the circumstances. It was found that taking the ear off a large stalk, such as is produced by the common mode of cultivation, inflicted a considerable wound upon the plant, which injured its health, and of course lessened its productive power. It was also found that the natural disposition to form grain was so strong, that several successive ears were thrown out, by which labor was increased, and the injuries of the plant multiplied. Lastly, it appeared that the juice yielded from those plants contained a considerable portion of foreign substance, not favorable to the object in view. Yet, under all these disadvantages, from one hundred to two hundred pounds of sugar per acre may be obtained.

The manifest objections detailed above suggested another mode of cultivation, to be employed in combination with the one first proposed; it consists simply in raising a greater number of plants on the same space of ground. By this plan, all the unfavorable results abovementioned were obviated, a much larger quantity of sugar was produced, and of better quality. The juice produced by this mode of cultivation is remarkably pure and agreeable to the taste. Samples of the sugar yielded by it are now in the Patent Office, with a small hand-mill by which the stalks were crushed. Some of the same kind was exhibited to our agricultural society in October, 1841, accompanied with an answer to an invitation from its president, Dr. J. W. Thompson, to explain the mode of culture and process of manufacturing the sugar. The molasses, after standing, as before mentioned, from one to two months, became filled with small crystals, which, on being drained, exhibited a peculiar kind of sugar; the grain is small, and somewhat inferior in appearance, but still is as sweet and agreeable to the taste as can be desired. A small sample of this sugar I have brought for your inspection. This product, from what was thought to be molasses, is a new and unexpected discovery, and discloses an important fact in the investigation of this subject. It shows the superior degree of perfection attained by the corn plant, compared with the cane, in any part of the Union. It is generally understood that the latter can not be fully

matured in any except a tropical climate, and the proportion of molasses obtained from any plant is greater or less according to the immaturity or perfection of its growth. The sweetness of the cornstalk is a matter of universal observation. Our forefathers, in the revolutionary struggle, resorted to it as a means to furnish a substitute for West India sugar. They expressed the juice, and exerted their ingenuity in efforts to bring it to a crystallized state; but we have no account of any successful operation of the kind. In fact, the bitter and nauseous properties contained in the joints of large stalks, render the whole amount of juice from them fit only to produce an inferior kind of molasses. I found, on experiment, that, by cutting out the joints, and crushing the remaining part of the stalk, sugar might be made, but still of an inferior quality. The molasses, of which there was a large proportion, was bitter and disagreeable.

From one to two feet of the lower part of these stalks was full of juice; but the balance, as it approached the top, became dryer, and afforded but little. From the foregoing experiments we see that, in order to obtain the purest juice, and in the greatest quantity, we must adopt a mode of cultivation which will prevent the large and luxuriant growth of the stalk.

As we are upon the threshold of this inquiry, many other improvements may be expected in the mode of operation; for example, it may be that cutting off the tassel as soon as it appears on the plant will prevent the formation of grain, and prove a preferable means for effecting that object.

On the whole, there appears ample encouragement for perseverance. Every step in the investigation has increased the probabilities of success; no evidence having been discovered why it should not succeed as well, if not better, on a large scale, than it has done on a small one.

1. In the first place, it has been satisfactorily proved, that sugar of an excellent quality, suitable for common use without refining, may be made from the stalk of maize.

2. That the juice of this plant, when cultivated in a certain manner, contains saccharine matter remarkably free from foreign substances.

3. The quantity of this juice (even supposing we had no other evidence about it) is sufficiently demonstrated by the great amount of nutritive grain which it produces in the natural course of vegetation. It is needless to expatiate on the vast advantages which would result from the introduction of this manufacture into our country.

Grain is produced in the West in such overflowing abundance that the markets become glutted, and inducements are offered to employ the surplus produce in distillation. This business is now becoming disreputable. The happy conviction is spreading rapidly, that the use of alcohol as a beverage, instead of conducing to health and strength, is the surest means of destroying both. Some other production, therefore, will be required, in which the powers of our soil may be profitably employed. This, it is hoped, will be found in the business now proposed. Instead of distilleries, converting food into poison, we may have sugar-houses, manufacturing at our doors an article in universal demand, not merely useful, but necessary, furnishing as it does one of the most simple, natural, and nutritious varieties of human sustenance found in the whole range of vegetable production.

It is said that the general use of sugar in Europe has had the effect to extinguish the scurvy and many other diseases formerly epidemical. It may be doubted whether a tropical country can ever furnish a great amount of exports, except through the means of compulsory labor. It appears, then,

highly probable, that if the inhabitants of temperate countries wish to continue the use of sugar, they must find some means to produce it for themselves. The beet appears to succeed well in Europe, and the manufacture from it is extending rapidly; but there is no hazard in making the assertion that Indian corn is far better adapted to our purpose. The following mode of cultivating the plant, and making the sugar, is the best that can now be offered. The kind of soil best adapted to corn is so well understood, that no directions on this point are necessary, except that it should be rich—the richer the better; if not naturally fertile, manure must be applied, either ploughed in or spread upon the surface, or used both ways, according to the ability of the owner. Nothing can form a better preparation for the crop than a clover sod well turned under and harrowed fine immediately before planting.

Select for seed the largest and best ears of any variety of corn not disposed to throw up suckers or spread out in branches; that kind most productive in the neighborhood will be generally the one best adapted to the purpose. The planting should be done with a drilling machine. One man, with a pair of horses and an instrument of this kind, will plant and cover, in the most perfect manner, from ten to twelve acres in a day. The rows (if practicable, let them run north and south) two and a half feet apart, and the seed dropped sufficiently thick in the row to ensure a plant every two or three inches. A large harrow, made with teeth arranged so as not to injure the corn, may be used to advantage soon after it is up. The after culture is performed with a cultivator, and here will be perceived one of the great advantages of drilling: the plants all growing in lines, perfectly regular and straight with each other, the horse-hoe stirs the earth and cuts up the weeds close by every one, so that no hand-hoeing will be required in any part of the cultivation. "It is a part of the system of cane planting in Louisiana, to raise as full a stand of cane upon the ground as possible, experience having proved that the most sugar is obtained from the land in this way." As far as my experience has gone, the same thing is true of corn. This point must therefore be attended to, and the deficiencies, if any occur, made up by timely replanting.

The next operation is taking off the ears. Many stalks will not produce any; but, wherever they appear, they must be removed. It is not best to undertake this work too early, as, when the ears first appear, they are tender, and can not be taken off without breaking, which increases the trouble. Any time before the formation of grain upon them will be soon enough.

Nothing further is necessary to be done until the crop is ready to cut for grinding. In our latitude, the cutting may commence with the earlier varieties about the middle of August. The later kinds will be ripe in September, and continue in season until cut off by frost. The stalks should be topped and bladed while standing in the field. They are then cut, tied in bundles, and taken to the mill. The top and blades, when properly cured, make an excellent fodder, rather better, it is believed, than any hitherto used: and the residuum, after passing the rollers, may easily be dried and used in the same way—another advantage over the cane, which, after the juice is expressed, is usually burnt.

The mills should be made on the same general principle employed in constructing those intended for grinding cane. An important difference, however, will be found both in the original cost and in the expense of working them. Judging from the comparative hardness of the cane and cornstalk,

it is believed that one fourth part of the strength necessary in the construction of a cane mill will be amply sufficient for corn, and less than one fourth part of the power will move it with the same velocity. It may be made with three upright wooden rollers, from twenty to forty inches in length, turned so as to run true, and fitted into a strong framework, consisting of two horizontal pieces, sustained by uprights. These pieces are mortised, to admit wedges on each side the pivots of the two outside rollers, by which their distances from the middle one may be regulated. The power is applied to the middle roller, and the others are moved from it by means of cogs. In grinding, the stalks pass through on the right side of the middle cylinder, and come in contact with a piece of framework called the dumb returner, which directs them backward so that they pass through the rollers again, on the opposite side of the middle one. (See plate.) The modern improved machine is made entirely of iron, three horizontal rollers, arranged in a triangular form, one above and two below; the cane or stalk passes directly through, receiving two pressures before it escapes. (See plate.) The lower cylinders are contained in a small cistern which receives the juice. The latter machine is the most complete; the former the least expensive. These mills may be moved by cattle; but, for large operations, steam or water power is preferable. When the vertical cylinders are turned by cattle, the axis of the middle one has long levers fixed across it, extending from ten to fifteen feet from the centre. To render the arms firm, the axis of this roller is carried up to considerable height; and oblique braces of wood, by which the oxen or horses draw, are extended from the top of the vertical axis to the extremities of each of the arms. When horizontal cylinders are propelled by animal power, the upper roller is turned by the cogs at one end, which are caught by cogs on a vertical shaft. It is said that, in the West Indies, the purest cane juice will ferment in twenty minutes after it enters the receiver. Corn juice has been kept for one hour before boiling, without any apparent injury resulting; but so much delay is not desirable, as it may be attended with bad effects.

The process which has been employed in the manufacture of maize sugar is as follows: The juice, after coming from the mill, stood for a short time, to deposite some of its coarser impurities. It was then poured off, and passed through a flannel strainer, in order to get rid of such matters as could be separated in this way. Lime water, called milk of lime, was then added, in the proportion of one or two tablespoonfuls to the gallon. It is said by sugar manufacturers that knowledge on this point can only be acquired by experience; but I have never failed in making sugar from employing too much or too little or the lime. A certain portion of this substance, however, is undoubtedly necessary, and more or less than this will be injurious; but no precise directions can be given about it. The juice was then placed over the fire, and brought nearly to the boiling point, when it was carefully skimmed, taking care to complete this operation before ebullition commenced. It was then boiled down rapidly, removing the scum as it rose. The juice was examined from time to time; and if there was any appearance of feculent particles, which would not rise to the surface, it was again passed through a flannel strainer. In judging when the sirup is sufficiently boiled, a portion was taken between the thumb and finger; and if, when moderately cool, a thread half an inch long could be drawn, it was considered to be done, and was poured into broad shallow vessels, to crystallize. In some cases, crystallization commenced in twelve hours; in others, not till after several days; and in no

case was this process so far completed as to allow the sugar to be drained in less than three weeks from the time of boiling. The reason why so great a length of time was required, I have not yet been able to discover. There is no doubt but that an improved process of manufacture will cause it to granulate as quickly as any other.

Enough has been said to enable any one so disposed to manufacture sugar from maize.

As to the profits of the business, I shall make no positive assertions; experience on the subject is yet too limited to warrant them; and, as all the facts in relation to it are now before the public, every one interested can draw his own conclusions. It is said, by those acquainted with the cultivation of the cane, that that business can not be carried on profitably on less than one hundred acres in crop; and that attempts on a small scale will be certain to fail, with a great loss of time and labor. How far this may be applicable to corn remains to be seen.

Some comparison between the cultivation of cane and that of corn may perhaps be interesting.

The cane lands in Louisiana are redeemed to agriculture by strong embankments along the river, and by numerous ditches, which extend back into the swamp to a considerable distance beyond the line of cultivation. The ground is still further divided, by smaller ditches, into lots of from one to two acres in extent. It is extremely rich and productive, but the expense of draining and keeping up the embankments must be very considerable; this forms the first difference to be noted in the culture of the two plants under consideration.

The best season for planting cane in Louisiana is in the fall, which is also the time of harvest, when labor is most valuable, and the greatest exertions are required to secure the crop before it is destroyed by frost.

But the most striking difference will be found in the cost of seed, and in the labor of planting. The cane is propagated by layers; these are partly furnished from the tops of the plants, when cut for grinding, but are principally ratoons. Of the latter, it requires the produce of one acre to plant three. The grain from one acre of corn will be sufficient for planting forty acres; therefore, the difference in expense for seed will be as one to thirteen.

In planting cane, furrows are made with the plough from two and a half to three feet apart; in these the layers are placed, in a double row, and the earth drawn over them, with hoes, to the depth of three or four inches.

In the spring, before the plants are up, this covering is partly scraped off, so as to leave them buried from one to two inches. From this account, it is evident that no more manual labor will be required to drill fifty acres in corn, than to plant one acre in cane. The labor of cultivating the latter plant during its growth is also greater; but this may be balanced by the extra work required to take off the embryo ears from the corn. When cultivated in the mode recommended, the stalk of corn is soft, remarkably heavy, and full of juice from bottom to top. The amount of power required for grinding them must be much less than is necessary for cane, or, what is the same thing, an equal power will do it with greater rapidity. The average yield of cane in Louisiana, is one thousand pounds of sugar and forty-five gallons of molasses per acre. From the above comparative statement, it would appear that one half of this amount of crop from corn would be equally, if not more, profitable.

I will only add, in conclusion, that whether or not the sugar from the cornstalk may soon become an article of profitable export, its manufacture in the simplest form will enable every family to supply themselves with this article for common use, now become so much a necessary of life, and thus save a considerable bill of expense yearly paid for foreign sugars.

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*Extract from Annales de la Société Polytechnique Practique, No. 22, for October, 1839.**

Sugar or Corn.—There is no plant of greater general interest or utility than Indian corn. It can serve under a great variety of different forms for the nourishment of man and the domestic animals, and, above all, the application of industrious science.

In reference to its saccharine qualities, maize has not been sufficiently appreciated. Travellers report that under the tropics the stalk of this plant is so very saccharine that the Indians suck it as in other places they do the sugar-cane. M. Pallas, who has made a great many researches on this application of maize, has arrived at a remarkable result. He has found by many experiments, both in France and more recently in Africa, that this vegetable, by a simple modification applied to its culture, is able to furnish a much more considerable quantity of sugar than by the ordinary method. This method consists in detaching from the plant immediately after the fecundation of the ovaries (after the plant has tasselled) the young ear, and to leave it to develop itself thus deprived of its fruit. Arrived at maturity, the stalk of Indian corn contains crystallizable sugar in quantity very often double that obtained when the plant is left to mature with the grain. In fact, by the ordinary mode of culture, the grain is nourished at the expense of the sugar in the stalk, as it absorbs a great quantity of this immediate principle, which, by the process of nutrition, is converted into starch. On the other hand, if the young ears are immediately destroyed, the sugar intended to nourish them remains in them, where it accumulates, and the maize plant is thus converted into a true sugar-cane, while the fibrous part can be manufactured into paper.

The quantity of sugar is so very great in the stalk of the maize deprived of the ear, that the pith of this vegetable retains a sensible flavor of sugar, even after it has been dried, as is easily proved by examining the specimens deposited by M. Pallas in the bureau of the Academy of Sciences. These results are so important as to merit experiments on a grander scale, which may obtain thus for France a source of new industry in the manufacture of sugar.

No. 4.

Dear Sir: Your favor is duly received. You request to know the best method of crystallizing corn sirup, and I know of no more ready method

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* Translated at the Patent Office, and highly confirmatory of Mr. Webb's essay.
H. L. ELLSWORTH.

to afford the information required than to detail the entire mode which should be pursued for its manufacture:

1st. To cut the cane as ripe as possible, but before any acetic acid is formed; litmus paper, touched to the fresh cut cane, will turn red if acid.

2d. Express the juice without loss of time, as every moment after cutting will deteriorate its quality.

3d. A small quantity of clear lime water (say one quart to a hundred gallons of juice) should be added the moment it is expressed, unless the juice shows acidity with litmus paper; in that case no lime should be used, but a solution of sal soda or soda ash should be added, until it is precisely neutral.

4th. When the juice is neutral (free from excess of acid or alkali), it should be evaporated in such an apparatus as would finish its charge in 30 minutes; if the boiling power is too small, good crystallization can not possibly be obtained.

The whole time occupied from the cutting of the cane to finishing its boiling should not exceed one hour.

5th. *To know when the boiling is finished*, place a thermometer in the kettle, and continue to evaporate until it stands at 239° Fahrenheit. If, when placed to run off after cooling it should be found too freely boiled, the next time boil to 240°, or, if too light to run off, to 238°, and so on.

6th. The kettle or bottle should be so arranged that the moment it is done its charge should be thrown into a cooler capable of holding a number of charges. The first charge should be left in the cooler, with stirring, until the second charge is thrown in, then with an oar scrape the crystals found on the side and bottom of the cooler loose, and gently stir the whole mass together (the less stirred the better); so continue at the letting in of each charge to stir gently, and, when all is in the cooler, let the whole stand until it cools down to 175°, then fill out into sugar moulds of a capacity not less than 14 gallons. When cooled in the mould sufficient (say fourteen hours), pull the plug out of the bottom of the mould, and insert a sharp point nearly as large as the hole, some six inches; withdraw the point, and stand the mould on a pot to drip.

7th. If the sugar is intended to be brown, leaving it standing on the pot for a sufficient length of time, in a temperature of 80°, will run off its molasses, and leave it in a merchantable shape; it will probably require twenty days. It can then be thrown out of the mould, and will be fit for use. When moulds can not be obtained, conical vessels of wood or metal, with a hole at the apex, will answer equally well.

The above description will be sufficient for any operator if strictly followed; but should any of your friends wish to make the experiment on a large scale, or to produce white instead of brown sugar at a single operation, they had better see me personally before commencing, as the kind of kettle, and many other minor particulars, will be important. The above description, however, is fully sufficient for the use of the farmer. If the juice of cornstalks be manufactured with the rapidity named in the former part of this letter, no clarification will be necessary, and scum which may rise during the boiling can be taken off with a skimmer; but in the *large way* both clarification and filtration would be requisite, as in large operations every part of the kettle can not be got at to skim. Since I last saw you I have made some experiments on the cornstalk, and, if your statements are correct as to the quantity of juice which can be obtained from

the acre, then there can be no doubt of its entire superiority over the sugar-cane. I fear, however, that the enthusiasm of those who made the experiments you spoke of has led them into errors. It is true that the juice of the cornstalk, grown with a view to sugar making, will yield a juice at 10° Beaumé. I have made arrangements to try the experiments fully in the coming summer, and, when done, will communicate the results.

I remain, sir, yours, respectfully,

J. J. MAPES.

Hon. H. L. ELLSWORTH.

No. 5.

NORTHAMTON, (MASS)., *October* 1, 1842.

DEAR SIR: Sometime ago I intimated to you that I should furnish you with an account of the cultivation of broomcorn in this region. Such an account I now enclose.

Respectfully, I am your obedient servant,

WILLIAM ALLEN.

Hon. H. L. ELLSWORTH,
Commissioner of Patents.

BROOMCORN.

Of the genus sorghum (broomgrass) there are four or five species. *Sorghum saccharatum* is the broomcorn, abundantly cultivated in this country, both for the seed and for its large panicles, which are made into the brooms. The whole plant is saccharine. Attempts have been made in France to extract sugar from it, but with little success.

The other species are the following: *Sorghum dora* (or holcus dora), common Indian millet, a native of the East Indies, but cultivated in the south of Europe, *s. bicolor*, or two-colored Indian millet, *s. caffrorum*, caffres Indian millet, and *s. nigrum*, coal-black Indian millet.

Of the *sorghum saccharatum* (or *holcus saccharatus*), broomcorn, there are several *varieties* raised in Hampshire county, Massachusetts, in the valley of the Connecticut river, principally in the broad meadows of Northampton, Hadley, and Hatfield. The *pine tree* kind is regarded as the poorest kind, or the least advantageous for cultivation; yet, as it is the earliest (being three weeks earlier than the large kind), in a short season, when its seeds will ripen, while the seeds of the other kinds fail to ripen, this may prove the most profitable crop. The North river kind is ordinarily the best crop; it is ten days earlier than the large kind, and yields about 750 pounds of the *brush* per acre—the brush meaning the dried *panicles*, cleaned of the seed, with 8 or 12 inches of the stalk. The New Jersey, or *large kind*, yields a thousand or eleven hundred pounds of brush per acre. The stalks and seed are large. In good seasons, this is the most profitable crop. But in the present season (1842), owing to an early frost, (about September 23), much of the seed of this kind will fail to ripen.

There is also the *Shirley*, or *black brush*. Soil rich, alluvial lands are best adapted for the broomcorn, more especially if warmly situated, protected by hills, and well manured.

Method of planting.—The broomcorn is planted in rows, about 2½ or 3 feet apart, so that a horse may pass between them with a plough, or cultivator, or harrow. The hills in each row are from 18 inches to 2 feet apart, or further, according to the quality of the soil. The quantity of seed to be planted is estimated very differently by different farmers—some say that half a peck is enough per acre, while others plant half a bushel, and some a bushel, in order to make it sure, that the land shall be well stocked. The rule with some is to cast a teaspoonful, or 30 or 40 seeds, in a hill; the manure, at the time of planting, should be put into the hill, and old manure, or compost, is preferred, as being most free from worms.

Cultivation.—The broomcorn should be ploughed and hoed three times—the last time when about three feet high, though some hoe it when it is 6 feet high, and when they are concealed by it as they are toiling in the field. The number of stalks in a hill should be from 7 to 10. If there are only 5 or 6 stalks, they will be larger and coarser; if there are about 8, the brush will be finer and more valuable. In the first hoeing, the supernumerary stalks should be pulled up.

Harvesting.—As the frost kills the seed, the broomcorn is harvested at the commencement of the first frost. the long stalks are bent down at 2 or 2½ feet from the ground; and by laying those of two rows across each other obliquely, a kind of table is made by every two rows, with a passage between each table, for the convenience of harvesting. After drying for a few days, the brush is cut, leaving of the stalk from 6 to 12 inches. The longer it is cut, of course, the more it will weigh; and, if the purchaser does not object, the benefit will accrue to the farmer. However, the dry stalks weighs but little; if its weight is excessive, the purchaser sometimes requires a reduction from the weight. As it is cut, it is spread on the *tables*, still further to dry. As it is carried into the barn, some bind it in sheaves; and this is a great convenience for the further operation of extracting the seed. Others throw the brush into the cart or wagon, unbound.

Scraping.—The process of extracting the seed is called "scraping the brush." Two iron horizontal scrapers are prepared—one moveable, to be elevated a little, so that a handful of brush may be introduced between them. The upper scraper is then pressed down with one hand, and the brush drawn through with the other, the seed being scraped off. This is the old method. A newly invented scraper is superseding the old one. It is an upright instrument, of elastic wood or steel, inserted in a bench of a convenient height for the operator.

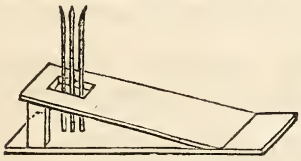
The form is as follows:

a is a piece of wood or steel, immovable; *b* and *c* are pieces which are *elastic*, moveable to the right and left at the top, but fastened to the central piece below. The degree of elasticity may be regulated by wedges in the planks *d* and *f*—wedges in the hole through which the pieces pass.

A quantity of brush is taken in the hand and brought down upon the top of this instrument. As it is forced down, and drawn toward the body, it separates the elastic sticks from the central piece, but their elasticity presses sufficiently on the brush, so that the seed is scraped off.

The advantage of this scraper is, that both hands may be applied to the brush, instead of only one hand, as in the other kind, and the elastic power of nature is substituted for the pressure of one of the hands. The instrument also seems to double the scraping surface. The instrument was invented at Hartford. I have been told it has not been patented.

The following plan may therefore be useful. The operator stands at the end A.



The lower plank may rest on the barn floor, or have short legs. The upper oblique has a hole through which the scraper passes, and down which the seed may fall. Each side of the instrument, a wedge may be inserted to regulate its elasticity, or by some other contrivance this object may be secured. In scraping, the panicles must first be laid evenly together, and the stalks taken in the hand. If this is not done in the field, and bundles not formed, then must it be done with considerable labor at *the time* of scraping in the barn.

Product.—A common crop is 700 to 800 pounds per acre. There have been raised 1,000 and 1,100 pounds per acre, with 80 to 100 bushels of seed. The large kind grows eleven feet high.

Value of the crop.—About the year 1836 or 1837, the brush sold for 12½ cents a pound; and one farmer in Northampton sold his crop, standing, unharvested, at one hundred dollars per acre. Since then, the price has been decreasing. This year it has been four and five cents. At six cents, the farmer, for 800 pounds, gets $48 an acre, besides 60 or 70 bushels of seed worth a third of a dollar a bushel—so that he receives $70 or upward from an acre.

Good farmers regard the seed alone as equal to a crop of oats from the same land. Some land owners have rented their land for broomcorn, at $25 per acre, they putting on five or six loads of manure.

One farmer, who, a few years ago, cultivated 50 acres in broomcorn, must have had an almost unequalled income for a New England farmer.

Quantity.—In Northampton, probably 200 acres are raised; in Hatfield, 300; in Hadley, 400; in other towns, Whateley, Deerfield, Greenfield, Easthampton, Southampton, South Hadley, Springfield, and Longmeadow, perhaps 300 or 400 acres more; in all, in the valley of the Connecticut, 1,200 or 1,300 acres; the product, in brush and seed, worth about $100,000.

Manufacture of brooms.—Individuals tie up brooms with wire or twine. The expense is greater for materials and labor when wire is used.

The turned broom-handles cost, as delivered, one dollar a hundred—one cent each. The expense of other materials and labor in making a broom is 6 cents, or the whole about seven cents. In a good broom, a pound and a half of brush is employed, which, at the present price of 5 cents, would be 7½ cents, so that a broom made with wire costs now about 14½ cents. A manufacturer recently went to Boston, and could get an offer of only 12 cents, or 12 dollars per hundred for his brooms; at which rate he could not afford to sell them, and chose to retain them. Brooms are made with brush weighing ¾ of a pound, 1 pound, 1¼ pound, and 1½ pound. The brush is whitened by the manufacturer. It is placed in a large tight box, and bleached by the fumes of sulphur; but this process is said to weaken the brush. Who would think of whitening broom brush for beauty? Thus it is that fashion descends into the vale of life, and to the humblest of concerns. Why should not the housemaid wield a beautiful broom, with white brush and variously interlaced wire, and polished and variously colored handle?

Miscellaneous.—A few remarks will be added, some of which were omitted in their proper places. If the stalks are cut before the seed is ripe they are better, stronger, more durable, than if cut after the seed is ripe. In this case the farmer would lose the value of the seed. He of course will not submit to this loss unless it is made up to him by the increased price of the brush.

The seed is used for feeding horses, cattle, and swine. It is ground and mixed with Indian meal, and is regarded as excellent food—it weighs forty pounds a bushel.

Mr. Shipman, of Hadley, is the greatest manufacturer of brooms in the valley of the Connecticut. If he employs, on an average, ten hands, and each hand makes 25 brooms per day, the number made in a year would be 78,000. It is said he has made 100,000.

The brush, when it is put in the barn, should be placed on a scaffold, so as to be exposed to a circulation of the air, that it may dry and not mould. For all the purposes of use, a broom made with twine is equal to one made with wire; and a man can make several more of them in a day.

Mr. Shipman uses 300 or 400 pounds of large twine, at 20 to 30 cents a pound, and 2,000 pounds of small twine, at 31 cents. Perhaps he manufactures only an eighth part of the brooms manufactured in Hadley.

At the price of 20 cents, the price of brooms a few years ago, the broom manufacture of Hadley would thus amount to $160,000.

It is probable that the extended cultivation of the broomcorn will reduce the profits on this product to the average profits of good farming.

No. 6.

CLEVELAND, OHIO, *December* 7, 1842.

DEAR SIR: The manufacture of pot and pearl ashes is a very important item in the clearing of land in a new timbered country, and is of great importance to the new settler, being obtained previous to getting a crop from his land.

From an experience in the manufacture of ashes for twenty years in the northern part of Ohio, I think the manufacture of pearlashes is best adapted to a new country. In most cases, the best economy for the farmer is to leach and boil his lie into salts, and sell them to the manufacturer in the form of black salts, which is simply by setting up leaches, putting in a loose bottom raised one or one and a half inches each above the tight bottom, on this a layer of straw, fill the leach with ashes, and use hot water. Boil the lie in kettles or pans until it crystallizes dry. These black salts find a ready market with the manufacturer of pearlashes.

House ashes are much preferable for the manufacture of pearlashes. In manufacturing potashes, lime should be used freely in the bottom of the leach; and it is well to put lime in the water, and boiled, to wet down the ashes in the leach. The lie is boiled in kettles, and melted in potash kettles.

Cleveland affords quite an extensive market for pearlashes and scorched salts. The pearlashes are used in flint glass and saleratus manufactures; scorched salts for the manufacture of window glass. Scorched salts are made by simply burning the black salts in the oven once.

Our domestic markets net the best price to the manufacturer until supplied.

Cast iron pans, for evaporators, effect much saving in fuel and labor; they may be found in Cleveland. They are made, say three feet broad, four and a half long, and seven inches deep.

Potash kettles, of improved shapes and quality, are also made at Cleveland, which are pronounced very superior by those who have used them.

Should you deem any further information on the subject of manufacturing of importance to western settlers, please write such questions as you wish answered.

Yours, very respectfully,

W. A. OTIS.

H. L. ELLSWORTH.

No. 7.

FORT WAYNE, *December* 31, 1842.

SIR: I received your letter the last mail, requesting me to give you some information on the production of ashes, which I will according to the best of my judgment; and my experience the past season has been considerable.

Your first question is, *How many bushels* of ashes can be gathered from one acre of good timber? Answer. From *seventy-five to one hundred and fifty;* and every *four hundred bushels* of ashes carefully saved will produce one *ton* of potash or pearlash.

A very safe calculation is *five hundred pounds* of pot or pearl ash to one acre of good timber, that at the present time is worth twenty-five dollars. I believe that the ashes off the first crop of good timber land is the most profitable one, as times are at present. A man would want about one hundred dollars' worth of potash kettles to begin with, which would be the principal expense, except his own labor. He could have a very quick return; *ashes can be turned into potash in thirty six hours.*

Respectfully yours,

H. WORK.

Hon. H. L. Ellsworth.

N. B. I wish you would send me the most approved plan for making lard oil as early as possible; and any information that I can give you at any time I will do it with pleasure. H. W.

No. 8.

Kensington, Philadelphia, *January* 8, 1843.

Sir: In answer to your inquiries upon the subject of converting lard into oil, and also into concrete forms for the manufacture of candles, I hasten to say, that, having been and still continuing very much engaged in chymical processes upon lard, I am not able, in the short time I can devote to the subject of your letter, to give you the ample information which is desirable, and which, if more at leisure, I could readily furnish. I, however, write off, *currente calamo*, the result of some of my experiments in this branch of inquiry, which, perhaps, may be serviceable. The article of lard offered for sale in the market for domestic use, and now about to be so much in demand as material for the manufacture of lard oil and candles, is prepared from the adipose matter of the omentum an mesentery of the hog, by freeing it with the hand from the membranous substance connected with it, washing with water until colorless, and melting with moderate heat, continued until the dissipation of all moisture, which fact is known by the transparency of the melted matter, and the absence of *crepitacula*, when small portions are thrown on burning coals.

The chief source of this article is the west, whence it is brought in kegs of from forty to eighty pounds each; when fine, it is perfectly white in appearance, and rather inodorous, nearly tasteless, and, at moderate temperature, of a soft consistence, insoluble in water, and but partially so in alcohol. When exposed to the air, it becomes rancid by the absorption of oxygen; this rancidity, engendering a liability to injurious reaction, renders it unfit, in that State, to be used in pharmacy as an ingredient of cerates and ointments, of which it forms the principal part. For this purpose, therefore, it should be kept in close vessels free from contact of air.

Lard, as well as nearly all other fixed oils and fats, are composed of three proximate principles—two solid, called stearin (from *stear*, Gr. tallow) and margarin (from *margarites*, Gr. a pearl), and one liquid, of which there are two varieties, called olein (from *elaion*, Gr. oil).

Stearin characterizes, for the most part, animal fats. Margarin, vegetable and olive, is almost universally present in both. The first two are essentially different from each other. Margarin is distinguished by its greater fusibility,

its being more soluble in cold ethers, and the necessity of evaporation to procure it from such solution, while the stearin drops spontaneously during refrigeration.

Berzelius thinks these principles not identical in different oils, as their points of congelation and liquefaction vary according to the substance from which they are derived. Pelouze and Boudet, however, attribute the variable fusibility of the margarin and stearin of different fats to the existence of definite combinations of margarin and stearin, respectively, with olive; and think that each of these principles, in a state of purity, is probably the same, from whatever source obtained; and to prove which they assert having found the same margarin in palm oil as in human fat. But in oils, and particularly the vegetable, their investigations evinced the presence of two oleins, distinctive in their characters; one more soluble in different menstrua than the other, and with a less proportion of hydrogen, beside other properties inherent in the one not possessed in the other, more than the mention of which would occupy too much space and time.

The ultimate principles of fixed oils are carbon, hydrogen, and oxygen; the hydrogen being in much larger proportions than is necessary to form water. To this predominance of hydrogen is attributed the readiness with which they burn with flame; that property procuring for them all their usefulness as means of illumination or artificial light.

Stearin, the first named of the constituents of oil and fatty matters, is a concrete white substance, insipid and without smell, fusible at 110° Fahrenheit, insoluble in water and but partially so in alcohol.

Margarin, present in lard and most other fats, and forming by far the greater portion of olive oil, is more fusible than stearin, and, as its name indicates, of a pearly appearance, possessing also other properties different from stearin, mention of which has been made above. Olein, the oily principle formerly called elainis, when pure is quite colorless, and in some degree has the appearance and properties of vegetable oily liquid at 60° and congealing at 32° Fahrenheit, and, though not becoming rancid by exposure, acquires viscidity. The relative proportions of all these three principals are different in different fats.

Nearly all kinds of fat, under proper circumstances, are capable of combination with alkali; by which union the principles thereof are changed. By this reaction, they undergo *saponification*, and are transmitted, not by the absorption of any foreign substance, but by the union of the elements of a small portion of water into three peculiar acids, *stearic*, *margaric*, and *oleic*, which unite with the salifiable base and into a peculiar sweet principle glycerin (from *glukus*, Gr. sweet), which, in remaining behind, is not saponified. Of this sweet principle, there are formed about three during the saponification of every one hundred parts of lard or tallow.

Hog's lard in its natural state, Choiseul says, has not the property of combining with alkalis, but acquires it by experiencing some change in the proportion of its elements. This change being induced by the action of the alkali, it follows that the bodies of the new formation must have a decided affinity for that species of body which has determined it. These acids, generated during saponification by the action of the alkali, called adispasic or saponic acids, are, when *solid*, in appearance like wax, or spermaceti; when *liquid*, they appear as their oils, mostly fusible at temperatures below 212 deg. Fahrenheit.

The oleic, being generally mixed with that portion of margaric which is liquid at the time and temperature of its preparation, is used sometimes as lamp oil, but mostly for the manufacture of soaps, while the remaining small portion of margaric, being of a consistence sufficient to retain it with the stearic, is allowed to remain with that body, which, when used for candles, experiences no great disadvantage by its presence. Stearic, the most important, and by far the most characteristic product of the saponification of lard, tallow, and other not easily fusible fats, is the one of which, at your request, I am to speak in detail—an article the use of which for making candles bids fair to be in this country most extensive. The consequence which this branch of manufacture is about to assume, is no greater than its merits should obtain for it. Independent of all other advantages, the great reduction which it will occasion in the price of an article of such general and necessary use in domestic economy is alone sufficient to procure the attention which the subject will and does receive. Inferior in no degree to sperm, both as regards quality and appearance, the stearin candles have the advantage of greater cheapness, as they can be made, even by the English mode, hereafter given, at a cost of at least 20 per cent. less than sperm. The increasing importance of this subject induced my attention to it some eight or ten months previous; since which period my whole time has been devoted to its examination. The result of my investigation is a process entirely different from all others, to be executed with so much facility, and with so little cost of time, money, and labor, that I expect to make by it candles, in appearance and quality, as perfect and good, if not better, than sperm, and which when *retailed*, even at as low a price as 18¾ cents per pound, will afford a remunerating profit to the manufacturers, and a profitable commission to the vender. I mention this price in consideration of the present rates of lard, the supply of which, owing to the unexpected requisition for this purpose, is at present totally inadequate. When, however, this is removed by the increased supply which the producers will see it is their interest to furnish, the price of the material will be in a few years much lower. This, and the improvements which by that time I shall have made by my mode, will, I expect, enable me to manufacture candles at a price so reduced as to entitle them, when these superior properties are considered, to the substitution for the much-used but unpleasant mould and dipped candles.

I would willingly communicate fully the manner of conducting the process, but, having been at a great expense of time, money, and anxiety, I have determined to remunerate myself by carrying it into practice; and for this purpose, I am now arranging apartments in my laboratory, and hope, by the coming spring, to have for sale, in quantities, candles as good or better than the sample I sent you some weeks since.

I have spoken of lard, because this article will, without doubt, be the material from which to make these candles, both on account of the facility with which it can be procured in quantities, its comparative cheapness, and the profit on its oil, yielded in a preparatory stage of the process for manufacturing the stearic acid, of the substance of which the candles are made. This oil, now largely in use, under the name of lard oil, is nearly pure oleic, its only admixture being small portions of margarin and stearin, with which it becomes connected during preparation.

Its great superiority over sperm oil has caused it to be extensively substituted for that article, for lubricating the joints of machinery, and for

manufacturing purposes generally. As a burning fluid, it has proved itself equally good; and in corroboration of this is my experiment with lamps of eight ounces capacity, previously cleaned and new wicked for the purpose. This experiment was frequently repeated, with the same results. In one lamp was pure sperm; in the other lard oil, of only a fair quality, burnt under the same circumstances. The consumption of oil in both was equal; the quantity of light equal; the flame was different, that of the lard oil being of a reddish hue, and not so transparent as the sperm. The lamps were of glass, and such as are ordinarily used for burning common oils. There is an erroneous idea abroad, that it requires lamps of a peculiar construction to consume this oil. It is not so; for I use the laboratory lamps of the commonest make. If, however, the notion will be persisted in, instead of purchasing an expensive burner, all that is necessary is to have substituted, by any coppersmith, for your tin tubes in the lamps you may have, those of copper, filled off quite thin at the top, where the wick projects through, so as to prevent the passing off of too much heat; then the lamp will answer to burn lard as well as oil. The price of lard oil being at all times about 25 cents less per gallon than fair sperm, and being equally good, preference should therefore be given to it, both because of its economy, and of being a domestic production. It may be as well to mention that there are lard oils of various qualities—that prepared from dark-burnt lard is not so good for *burning*, because of its causing, after several hours' burning, a crust on the wick; and, as there has been a quantity of this kind of lard in market, and bought for manufacturing the oil, it is not surprising that there should be a slight prejudice against it as a burning fluid, This prejudice, however, is always removed by the use of that made from pure white lard.

It may be as well to say here some few words in relation to the burning of lard. To further the consumption of this oil, there has been introduced, by persons having at heart their own more than the interest of the community, an expensive lamp, which they advertise as being peculiarly adapted for this purpose. The substitute of lard for *its* oil possesses no advantage, either as regards price or convenience; the use of the latter being as economical, and much more cleanly, besides its not requiring additional expense for a peculiar kind of lamp. The liability of these burners to smoke, and other disadvantages, will, upon trial, convince any one of their inconvenience; and, if any other fact or corroboration is requisite, it is only necessary to say that, notwithstanding the grand display of the article in full flame at the last exhibition of the Franklin Institute, and the ample opportunity thereby afforded to judge of their deserts, so destitute were they of merit as not to have elicited even a passing notice or mention from the committee. If, however, lard is preferred to its oil, why go to the unnecessary expense of a new lamp, when any one you may have will answer fully as well, with the tubes altered as above directed? Further still, in proof of my assertions about the false economy of burning lard in preference to the lard oil (the lard oil, as my experiment before mentioned proves, being equal to sperm), I here insert the result of Harris & Co.'s experiments, cut from a Boston paper last week:

"TO THE PUBLIC.

"As much has been said of late respecting lamps, oil, and lard, the subscribers have caused a very accurate experiment to be made, whereby the

economy of oils and lard, producing light in the solar and carcel lamps, might be tested. These two descriptions of lamps were selected for the purpose, as they may be fairly deemed superior to all others in points of economy and safety. Wishing to satisfy all interested in the subject, and who may not have the conveniences necessary for the test, we shall give particulars of the experiment made November 10, 1842.

"The solar lamps, of the same size and construction, and one French carcel lamp, were used.

"*Time of burning, four hours.*

No. 1 denotes a solar lamp filled with whale oil.
No. 2 do solar do sperm oil.
No. 3 do carcel do sperm oil.
No. 4 do solar do hog's lard.
Weight of whale oil, 124 ounces per gallon, quality indifferent.
Weight of sperm oil, 120 ounces per gallon, quality good.

"*Lard of best quality, fresh and sweet.*

Nos.	Length of shadow.	Square inch.	Quantity burnt.	Cost per gallon.	Cost of quantity burnt.
No. 1	37.2 inch.	1383.84	8.5 oz.	50 cts.	3.42 cts.
No. 2	38.3 "	1466.89	9.5 "	80 "	6.33 "
No. 3	32.6 "	1062.76	8.25 "	80 "	5.50 "
No. 4	33.2 " / 27.25 "	922.40	9.25 "	8 cts. pr pound.	4.62 "

"Each lamp was made to give as much light as possible at the commencement of the experiment, and the strength of shadows then measured. Nos. 1, 2, and 3, maintained the same degree of light during the whole time of burning. The light from No. 4 had perceptibly decreased in two hours, and, at the close of the experiment, had receded upward of 16 per cent. Consequently, the mean quantity of light given during the four hours is taken in estimating their relative powers.

"No. 1 (whale oil), compared with No. 4 (lard), gave 105 per cent. more light, in proportion to its cost.

"No. 1 (whale oil), compared with No. 3 (sperm oil), gave 111½ per cent. more light, in proportion to its cost.

"No. 1 (whale oil), compared with No. 2 (sperm oil), gave 75 per cent. more light, in proportion to its cost.

"The following table shows the expense of burning each of the above lamps one hour, omitting fractions of mills, and stating the comparative quantities of light in whole numbers.

No. 1, 8 mills; light equal to 13.
No. 2, 15 do do 14.
No. 3, 13 do do 10.
No. 4, 11 do do 9.

"The results stated in round numbers, showing the cost of each burning a given time, estimating the amount of light, and cost of materials, are as follows:

Whale oil,	in solar	lamp,	argand burner,	100.
Sperm oil,	do	do	do	175.
Hog's lard,	do	do	do	205.
Sperm oil,	in carcel,	do	do	211.

"Much care was taken in weight and measure of the materials, and the judgment of several persons accustomed to such experiments was taken in adjusting the shadows, and the calculations we believe to be correct. This any one can verify, as the elements are all stated above.

"We feel justified in recommending *the use of best winter-bleached whale oil in the solar argand lamp*, whereby the best artificial light now in use will be produced.

"HARRIS, STANWOOD, & CO.

"29 TREMONT ROW, BOSTON, *December*, 1842."

The mode now adopted for the preparation of this oil is that of graining the lard in a suitable and well-known manner, by which process the separation of the olein from the stearin is rendered more easy. This separation is effected by pressing the grained matter, enclosed in canvass bags, by means of a powerful press of proper construction. In this way, all the olein or lard oil is driven out, together with a small portion of margarin and stearin, not, however, in sufficient quantity to injure the oil. What remains in the bags (the stuff of which, after proper preparation, the candles are made) is the white constituent of the lard—stearin, with small portions of margarin and olein remaining with it; the removal of which (the press not being able to effect) must, in order to procure good candle material, be produced in some other way. To effect this, I have (as before stated), after much trouble and patient investigation, discovered an economical mode, and which (as I intended carrying it into practice immediately) I shall not make known, but will substitute therefor that practised in England, and which is found to answer admirably—the product thereof having so handsome an appearance, and being of so good a quality as to cause it difficult to distinguish it from the most refined wax. This fact of their handsome appearance is confirmed by the following paragraph, cut from a paper some days since:

"ACCIDENTAL POISONING.—It is well known that a salve, for the cure of chaps and wounds, is often made of virgin wax and oil; and some families, who live at a distance from an apothecary, make this medicine, at the moment it is wanted, by taking a wax candle and melting it into oil. In employing this remedy, made of a candle, a person is said to have been recently poisoned in France. The reason of it is this: candles are now no longer made of wax, but of suet, from which oil has been extracted to grease wools. This suet, in order to form candles, is combined with a great quantity of arsenic. It is therefore not astonishing that arsenic, which penetrates even by friction, can have a poisonous effect when applied to the raw flesh."

The advantage which my mode possesses over this is its greater economy, both in cost and time, of preparation, while the product is equally good as that by the English, which is as follows: Tallow lard, or the solid part

of lard, after the separation of its oil or any fat, is boiled with quick lime and water in a large vat, by means of perforated steam pipes distributed over its bottom. After several hours' active boiling, the combination becomes sufficiently complete. The stearate thus formed is allowed to cool, until it becomes a concrete mass. It is then to be dug out, transferred to a suitable vessel, and decomposed by a sufficient quantity of sulphuric acid. This decomposition of the soap, says the patentee, should be made in a large quantity of water, kept well stirred during the operation, and warmed by steam introduced in any convenient way. When the mixture has stood sufficiently long, the acid of the fat or tallow will rise to the surface, and the water, being drawn off, will carry the alkaline or saline matters with it; but if the acids or tallow should retain any portion of the salts, repeated portions of fresh water must be added to it, and the whole well agitated, until the acids have become entirely freed from alkaline matter.

The washed mixture of the three acids—stearic, margaric, and oleic—is next drawn off into tin or other suitable pans, and allowed to cool, and then reduced to thin shreds by a tallow cutter, an instrument used by all tallow chandlers. The next step is to encase the crushed mass in canvass or caryga bags, and then submit it to the action of a powerful hydraulic or the stearic cold process—a machine made for the purpose. By this means a large quantity of the oleic acid is expelled, carrying with it some little of the margaric. The cakes, after considerable pressure, are then taken out, and again subjected to the action of steam and water; after which, the supernatant stearic acid is run off into pans, and cooled. The cakes are then reduced to a coarse mealy powder by a rotary rasping machine, put into strong canvass bags, and submitted to the joint action of steam and pressure, in an hydraulic press of appropriate construction, called Smaudlay's stearin cold press.

By these means, the stearic acid is entirely freed from oleic acid. It is then subjected to a final cleansing in a tub with steam, melted, and cooled in clean vessels. These cooled masses, owing to their crystalline texture, are unfit to be made into candles. It is therefore necessary, in some way, to remedy this. The French do so by crushing the masses, and pressing with them small portions of arsenious acid. This, however, is an injurious and reprehensible admixture, not only on account of the liability of such accidents mentioned in a previous paragraph, but because of the volatility of the arsenious acid, causing the atmosphere, in a room where these candles have been burnt, after a short time, to be not only disagreeable but deleterious to inhale.

This assumption of crystalline form I prevent without the use of this poisonous substance, merely by a proper and peculiar arrangement in the concluding part of the process. The wick to be used in the manufacture of these improved candles is to be made of cotton yarn, twisted rather hard, and laid in the same manner as wire is sometimes coiled round the bass strings of musical instruments. For this purpose, straight rods or wires are to be procured, of suitable lengths and diameters, according to the intended size of the candle about to be made; and these wires, having been covered with cotton, coiled around them as described, are to be inserted in the candle moulds as the common wicks are; and, when the candle is made and perfectly hard, the wire is to be withdrawn, leaving a hollow cylindrical aperture entirely through the middle of the candle.

I have now given you what information my leisure has allowed me to prepare. I could extend my remarks, but have not now the time.

With the hope that this summary will answer your purpose, I remain yours, respectfully,

CAMPBELL MORFIT,
Manufacturing analytic chymist.

No. 9.

WASHINGTON, *January* 18, 1843.

SIR: In answer to your communication of yesterday, I beg leave to say, that, in obedience to instructions received from the general superintendent of lighthouses on the lakes, I procured, in the month of November last, a sample of lard oil manufactured in Cleveland, which was used in the light-house at Cleveland as an experiment. It had a fair trial, being placed in the centre lamp; the others were filled with sperm oil. The lard oil was found to give as brilliant a light, and burn equally well with the sperm. During the night, the lamps containing the sperm oil were trimmed twice; the one containing the lard oil was not trimmed. On examining the lights in the morning, at the time for extinguishing the same, the lamp containing the lard oil was found burning equal to those containing the sperm oil.

I have no hesitation in saying that I believe winter-pressed lard oil will burn equal to winter sperm oil.

I have the honor to be, very respectfully, your obedient servant,

WILLIAM MILFORD,
Collector of the Customs, Cleveland, Ohio.

Hon. H. L. ELLSWORTH,
Commissioner of Patents.

No. 10.

CLEVELAND, *December* 29, 1842.

DEAR SIR: Yours of the 21st is just received. In answer to your first query, viz: How much lard will a hog make weighing three hundred pounds, very fat, after taking out the hams and shoulders?

I would state that there is a great difference in hogs, as to their frame and the kind of food they have been fatted upon. The average Ohio hogs (common breeds) will produce, when tried by steam, fifty per centum lard, after deducting the hams and shoulders. The plan now generally adopted is, not to take out the shoulders; the sale for them is limited, and price low: the covering of fat will produce more in lard than the expense of curing would warrant. The mixture of the China and Berkshires, fed upon potatoes, or any other vegetable containing starch, as a principal food, would produce, when very fat, at least seventy per centum, after taking out only the hams.

The steaming apparatus is merely a tub with a false bottom, perforated with holes, lying about two inches above the bottom. The steam is introduced between the two bottoms, and so entirely separates the fat from the cells in which it was enclosed, that no pressing of scraps is necessary. The bones, lean, and scrap, are left on the false bottom, and the lard floats on the surface. With steam, at a pressure of five pounds to the inch, it will require

from eighteen to twenty hours to try off a tub full of any given quantity, steam in proportion of course; sixty pounds pressure would do it in one third the time. The great advantage of steam is, the whole of the lard or tallow is produced, and there is no danger of burning either.

The quality of the lard is good, but not equal to leaf lard or suet; the carcass fat does not contain as much of the concrete principle (stearin). Whole hog lard can not be refined and made hard without a portion of the oil is extracted. I take from twenty to forty per centum of the oil; then the balance goes through several washings in pure rain water by steam, after which it is refined lard. The expense is not more than one quarter cent per pound; but it is of more value to us than common lard, as we have a great deal of trouble and expense with it: and in only extracting a portion of the oil, we would lose by it, did it not command a better price in the market, which it should from its purity.

I can not give you any information about the quantity of tallow from beeves, as none have been slaughtered in this section for tallow; they (beeves) must also vary very much in the amount produced, depending upon their feed, &c. The bones are worth at least half a cent per pound to calcine. From them ivory black is made (worth two and a half cents per pound), by charring them in close iron vessels.

I used to decompose the lard in acid and neutral salts. When the affinity between the parts is destroyed, I separate them by means of canvass bags placed in powerful screw presses. If I wish to make candles of the residue, the pressure is continued until all the oil, by this means, is forced out. The contents of the bags are then subjected to the action of a powerful hydraulic press, and the stearin pressed to dryness.

To produce the winter oil, we have to expose the decomposed lard to the cold, in the same manner that the crude sperm oil undergoes to produce the winter-strained oil. Upon analysis, it is found that lard oil contains $79\frac{5}{10}$ carbon, and pure sperm oil $79\frac{5}{10}$; making three tenths of one per centum difference; the other equivalents of hydrogen and oxygen are the same, excepting the difference of the three tenths. For all uses (except painting) lard oil has no equal. It burns with a strong white light, and is entirely free from either smoke or smell. It does not contain any gelatine, which makes it a preferable article for all kinds of machinery; for wool it answers better than the olive oil, which it has superseded entirely. The oil of tallow is also well adapted for machinery; for burning it is not preferable to other oil, on account of its odor. Tallow only contains about twenty-eight per centum of oil, whereas lard contains on the average sixty-two. The stearin of both lard and tallow makes a better and harder candle than sperm, and the same amount in weight produces a great deal more light.

Since you were here, the works of this company have been increased, and are now running 2,000 pounds per day. Lard is coming in freely; we are paying five cents cash per pound. The oil sells readily at seventy-five cents by the cash, and one dollar at retail per gallon, in competition with some oil from Cincinnati, which is offered at $33\frac{1}{3}$ per centum lower.

My process is so entirely different, and the ingredients I use are so effective, that I find no difficulty in purifying the oil and lard after it is manufactured, and in producing a superior article to any other.

Yours, respectfully,

J. R. STAFFORD,

Agent Cleveland Lard Oil and Candle Co.

Hon. HENRY L. ELLSWORTH.

No. 11.

Mode of manufacturing elain and stearin from lard, &c., patented by John H. Smith, No. 122 Front street, New York city.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, John H. Smith, of the city of Brooklyn, in the county of Kings, and State of New York, have invented a new and useful improvement in the manner of separating from each other the elain and stearin which are contained in lard; by means of which improved process the operation is much facilitated, and the products are obtained in a high degree of purity; and I do hereby declare that the following is a full and exact description thereof:

The first process to be performed upon the lard is that of boiling, which may be effected either by the direct application of fire to the kettle, or by means of steam; when the latter is employed, I cause a steam tube to descend from a steam boiler into the vessel containing the lard; this tube may descend to the bottom of the vessel, and be coiled round on said bottom, so as to present a large heating surface to the lard, provision being made for carrying off the water and waste steam, in a manner well known; but I usually perforate this tube with numerous small holes along the whole of that portion of it which is submersed below the lard, thus allowing the whole of the steam to pass into and through the lard. To operate with advantage, the vessel in which the boiling is effected should be of considerable capacity, holding say from ten to a hundred barrels. The length of time required for boiling will vary much, according to the quality of the lard; that which is fresh may not require to be boiled for more than four or five hours, while that which has been long kept may require twelve hours; it is of great importance to the perfecting of the separation of the stearin and elain, that the boiling should be continued for a considerable period, as above indicated.

My most important improvement in the within-described process consists in the employment of alcohol, which I mix with the lard in the kettle or boiler at the commencement of the operation. When the lard has become sufficiently fluid, I gradually pour and stir into it, about one gallon of alcohol, to every eighty gallons of lard, taking care to incorporate the two as intimately as possible; and this has the effect of causing a very perfect separation of the stearin and elain from each other by the spontaneous granulation of the former, which takes place when the boiled lard is allowed to cool in a state of rest.

I sometimes combine camphor with the alcohol, dissolving about one fourth of a pound in each gallon of alcohol, which not only gives an agreeable odor to the products, but appears to co-operate with the alcohol to effect the object in view; the camphor, however, is not an essential ingredient, and may be omitted. Spirit of lower proof than alcohol may be used, but not with equal benefit.

After the boiling of the lard with the alcohol has been continued for a sufficient length of time, the fire is withdrawn, or the supply of steam cut off, and the mass is allowed to cool sufficiently to admit of its being laded, or drawn off into hogsheads, or other suitable coolers, where it is to be left at perfect rest until it has cooled down, and acquired the ordinary temperature of the atmosphere; as the cooling proceeds, the granulation consequent upon the separation of the stearin and elain will take place and become perfect.

The material is then to be put into bags, and pressed moderately, under a press of any suitable kind, which will cause the elain to flow out in a great state of purity, there not being contained within it any appreciable portion of the stearin; this pressure is to be continued until the stearin is as dry as it can be made in this way.

The masses of the solid material thus obtained, are to be remelted, and in this state to be poured into boxes, or pans, of a capacity of ten or twelve gallons, and allowed to form lumps, which I denominate blocks; these when removed from the vessels, are piled, or stacked, up for a week or ten days, more or less; the room containing it should be at a temperature of nearly 80°, which will cause a sweating, or oozing, from the blocks, and they will improve in quality; the blocks are then to be rolled in cloths, or put into bags, and these placed between plates, and submitted to very heavy pressure by means of an hydraulic press. After this pressure it is brought again into the form of blocks, and these are to be cut up by means of revolving, or other knives, or cutters. The pieces thus obtained, are to be put into bags, and subjected to the action of hot water or steam, in a press, until it becomes hard enough to be manufactured into candles, or put up for other purposes to which it may be desired to apply it.

The manner of subjecting it to the action of heated water, or of steam, is to place the bags containing the stearin, in a box, or chest, into which heated water, or steam, may be introduced, but not to such extent as to fuse the stearin. A follower is then to be placed against the bags contained in the box or chest, and moderate pressure made upon them; the material will now be found to have acquired all the required hardness, and to possess a wax-like consistence, such as would generally cause it to be mistaken for wax.

I am aware that alcohol has been used for the purpose of separating elain and stearin from each other in analytical chymistry; but the lard, or other fatty matter consisting of these substances, has, in this case, been dissolved in the heated alcohol, and the whole has been suffered to cool together; this process would be altogether inapplicable to manufacturing purposes, as the cost would exceed the value of the product. In my manufacturing process, instead of dissolving the lard in alcohol, I add a small proportionate quantity of the latter to the former, the whole of which is driven off at an early period of the ebullition; but by its presence, or catalyticality, disposes the elain and stearin to separate from each other, which they do, after long boiling and subsequent cooling. I do not, therefore, claim the use of alcohol in separating elain and stearin from each other, by dissolving the fatty matter in heated alcohol, and by subsequently cooling the solution; but what I do claim as my invention, and wish to secure by letters patent, is the within described method of effectively promoting their separation, by incorporating alcohol or highly rectified spirits with the lard in small proportionate quantities, say one gallon, more or less, of such alcohol or spirit to eighty gallons of lard, and then boiling the mixture for several hours, by which boiling, the whole of the alcohol will be driven off, but will have left the elain and stearin with a disposition to separate from each other, on subsequent cooling, as herein indicated and made known:

Witness: JOHN H. SMITH.

T. H. PATTERSON.
H. S. FITCH.

No. 12.

ERIE (PENNSYLVANIA), *January* 11, 1843.

DEAR SIR: Your favor of the 1st ultimo, making inquiries in relation to the culture, use, and comparative value of rapeseed in this section of country, came to hand by due course of mail.

From the best information I have been able to obtain, I reply to your interrogatories, as follows:

1st. Rape seed is raised in this section.

2d. Rich ground will produce from 25 to 40 bushels per acre.

3d. Ten quarts of oil may be obtained from a bushel of seed.

4th. Oil cake is worth per bushel about the same as oats.

5th. The oil is used in burning, and in the manufacture of woollen oil-cloth, &c., and is worth from seventy-five cents to one dollar per gallon.

6th. The seed should be sown about the 25th September, *three pints* to the acre. The ground should be well cultivated, and such as does not heave up; harvest in June following. It should be cut with the sickle when the stock is yellow, before it becomes dead ripe, to prevent a waste of seed. Let it lie in swath about eight days in dry weather, until the seed becomes black and shells easily. It is then put into a wagon, with a cloth in it, to prevent a waste of the seed. Take it to a barn with a tight floor, and thresh the seed; to be spread about four inches thick, and turned every day for eight days, to prevent moulding. Then it is ready for the manufacture of oil. After the oil is pressed, it must be clarified by chymical process, the same as other oil.

7th. It will not answer for painting.

8th. The stem is of no use, except for manure.

9th. Cake answers well for hogs, but better for sheep.

Very respectfully, your obedient servant,

A. SCOTT, *P. M.*

Hon. HENRY L. ELLSWORTH,
Commissioner of Patents, Washington, D. C.

No. 13.

Mode of fencing and ditching, &c.

A good embankment, three feet high, with a ditch, furnishing a drain for surplus water, is made with astonishing rapidity. The embankment affords a foundation for a short post to hold two or three rails, which is found sufficient either to enclose or exclude cattle. The machine to make the embankment need not cost over two dollars, including labor and materials. It may be constructed by any farmer with the help of an axe and auger. It seems almost incredible that two planks 12 feet long, united at an angle of 18 or 20 degrees, can throw up dirt with such facility. The wedge and inclined plane seem united, and the only difficulty is, to ascertain at what angle dirt will slide. The angle abovementioned will answer in most soils. If the angle should prove too obtuse, the brace in the rear might be so formed as to graduate the scraper as desired. If the planks

are extended in length, the height of the embankment may be increased, or the dirt thrown further from the furrow, if the object is to turnpike the soil or to grade it for rails; and it appears that the machine will greatly lessen the expense of making roads on lands where large roots form no obstacle to the common plough, which precedes this scraper. To expedite turning at the end of the furrow, a bent lever (a crooked joint will answer), affixed about the centre, will raise the machine so as to turn on a point, and much friction may be saved by tacking to the land side a few inches of plank at the front and rear, or by excavating the land side in the middle, if made from a solid stick. The land side should be one-fifth shorter than the wide plank or mould board, and a narrow strip of boiler or tire iron, can be fixed at the bottom of the mould board. To keep the land side from slipping a small plate of iron may be attached to the under side, at the rear, operating like the most approved plough.

A plough and scraper might be combined, but the same strength in two teams will be more desirable. When land is dear, the objection might arise that too much is wasted. This, however, will have no weight in the west, where land is plenty. Indeed, some in Europe have urged the benefit of sloping embankments, as they *increase* the surface for grazing, which is an admitted fact, the sides of a hill being greater than its base. An excavation is made on both sides of the embankment. The ditch is eighteen inches only, and the embankment eighteen inches above the common surface, making an elevation from the bottom of the ditch, perpendicularly, of three feet, and giving a slope at 40 degrees, of about four feet—the slope, in some soils, must not be over 30 degrees, which will depend upon the soil. Less than this would expose the bank to crumble by the frost, and more would make the acclivity so small as to permit cattle to ascend it. Nor is the improvement in making the embankment alone worthy of special notice. The posts are bored with despatch by one or more augers propelled by hand or horse power. The augers are two and a half inches, and these, by two apertures, make a mortise of five by two and a half; but the second hole is bored so as to cut the circumference of the first, to lessen the chip between the two, which is easily removed by a chisel or hatchet. The rails are sharpened by a circular saw, by cutting one side so that when two rails are brought together, they just fit the mortise. The lap of the rails is about six inches, and makes a neat appearance; additional strength is given by pinning the upper rail. If rails are cut twelve feet three inches, four hundred and forty panels will make a mile of fence. This will determine the number of posts which are inserted in a furrow when the fence is to be made six inches deep, before the ditch is commenced; this will save all excavation for posts by hand; aud, when the embankment is formed, the posts will be two feet in the ground.

If the team can travel twelve miles per day, this will give six passages on each side of the embankment, and completes one mile in extent in a day.

I will give an estimate of fencing different quantities of land. The size and shape of the tract materially affects the cost per acre.

2 teams, $2 50 each, one day (one with plough and one with scraper) - - - - - - - -	$5 00
1,320 rails sharpened and delivered, at Mr. Robinson's estimate, two cents - - - - - - - -	26 40
440 posts, bored complete, three cents - - - -	13 60

Setting posts and putting in rails five days - - - -	$5 00
Cost per mile - - - - - - - -	50 00
Add for contingencies twenty-five per cent - - -	12 50
	62 50

1	section,	640	acres,	4	miles,	cost $250 00,	which is per acre	$0 39
½	do	320	do	3	do	187 50,	do	0 58½
¼	do	160	do	2	do	125 00,	do	0 78
⅛	do	80	do	1½	do	93 75,	do	1 17
1/16	do	40	do	1	do	62 50,	do	1 56
3/32	do	20	do	¾	do	46 87,	do	2 34
6/64	do	10	do	½	do	31 25,	do	3 12½

When roads or unoccupied land do not adjoin, the expense will be reduced, since adjoining proprietors are bound to pay if they improve one half the value of the fence.

This estimate is made for common prairie land, which is not more than three miles from timber, and where the timber is good for splitting, and not over ten dollars per acre, and where the labor of mauling rails do not exceed seventy five cents per hundred.

A sketch of the ditch, fence, rails, scraper, and augers, is given. Augers with sliding cutters are decidedly preferable. See plate I, figures 1 to 9.

A very simple machine for boring posts may be seen by referring to figure 13, plate II. It may be constructed by an ordinary laborer. Between the uprights the post to be bored is fastened. The auger is changed by raising the piece of scantling, which holds down the same, and runs between two pieces of scantling fastened at one end by a hinge of leather or iron, and at the other by a pin. The holes are made to accommodate the wishes of the fence maker, as to the number and distance of the rails. A 2½-inch auger is recommended, as this, with two holes, will make a mortise 5 by 2½ inches. Any ordinary auger will answer if a crank is affixed to the same. The simplicity and utility of this machine will recommend itself.

PLATE I.

Fig. 1. Fence.
Fig. 2. Rails sharpened.
Fig. 3. Auger with cutters.
Fig. 4. Holes bored.
Fig. 5. Post, ditch, and embankment.
Fig. 6 and 7. Views of the scraper.
Fig. 8 and 9. Views of plough.
Fig. 10. Surface of the ground.

PLATE II.

Fig. 10. Cheap wood mill.
Fig. 11. End view of iron mill.
Fig. 12. Front view of iron mill.
Fig. 13. Post-boring machine.

PLATE I.

Fig. 1.

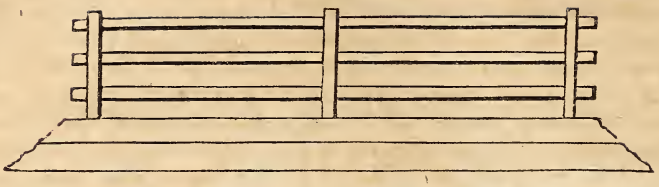


Fig. 2.

Fig. 6.

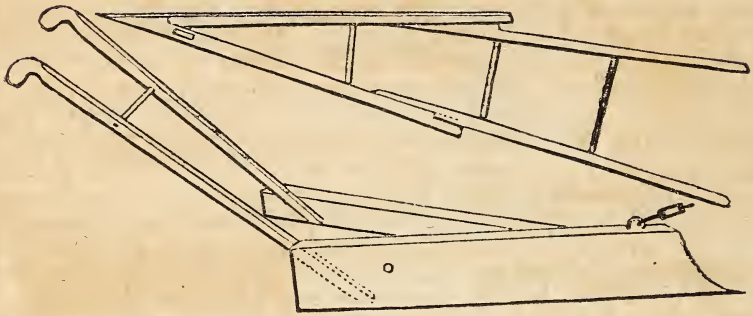


Fig. 7.

Fig. 3. *Fig.* 5. *Fig.* 4.

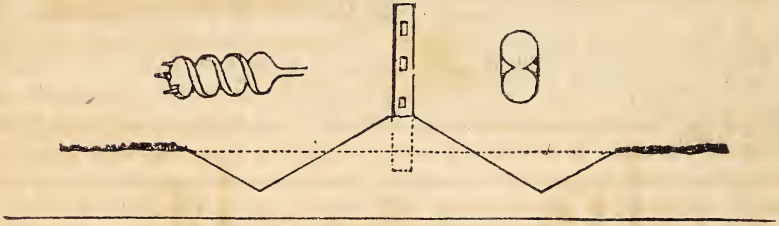


Fig. 8.

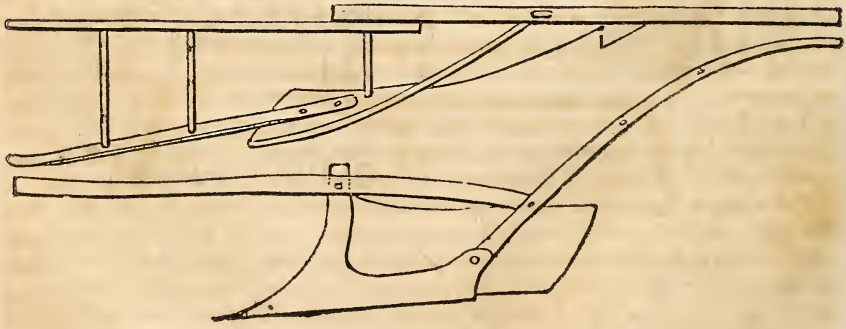


Fig. 9.

PLATE II.

Fig. 10.

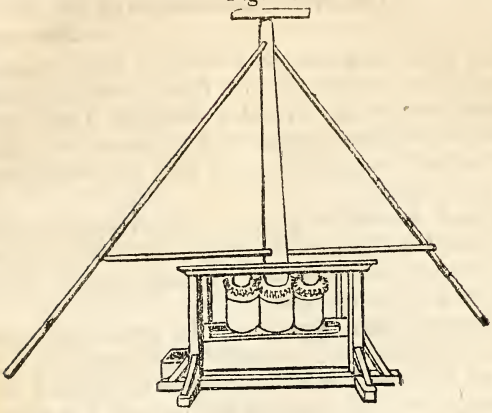


Fig. 11.

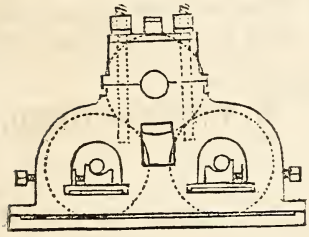


Fig. 12.

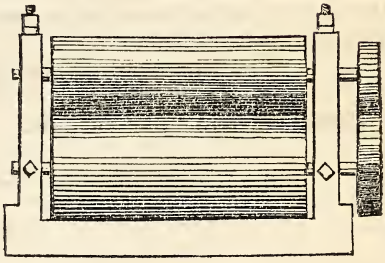
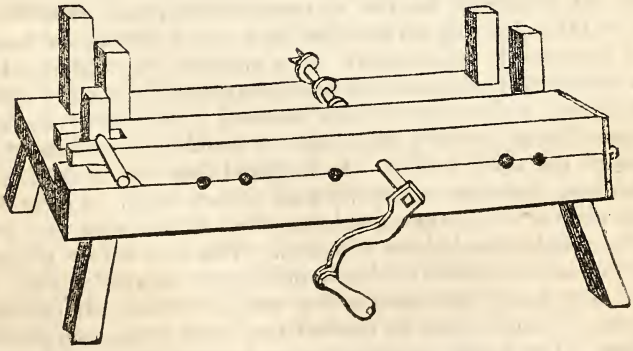


Fig. 13.



No. 14.

LAFAYETTE, TIPPECANOE CO., INDIANA,
January 20, 1843.

DEAR SIR: The plan proposed in several of your communications for *ditching* and *fencing* the western prairies, I feel confident from experiment, will prove eminently successful. In this assertion I am sustained by the opinion of many distinguished farmers in this country, who have examined a "scraper" or "ditcher," modelled on the plan you recommend, and have also witnessed its operations.

A machine designed for similar purposes, but manufactured and worked at a much greater cost, has been extensively used during the past summer in the northern counties of this State, and its employment, as far as I learn, has been attended with signal success.

For ordinary purposes, your ditcher will be preferable, costing as it does only two or three dollars, and requiring only a comparatively small outlay of labor. The cost of the machine above referred to, as used in the northern portion of the State, is several hundred dollars, and it is complicated in its structure.

The free use of ditching machines on the prairies and in the construction of roads will add thousands of dollars yearly to the value of western lands. Our farmers seem determined to ascertain the utility of these inventions by a thorough trial.

With sentiments of respect, yours truly,

H. W. ELLSWORTH.

Hon. HENRY L. ELLSWORTH.

No. 15.

Plan of cheap cottages.

After selecting a suitable spot of ground, as near the place of building as practicable, let a circle of ten feet or more be described. Let the loam be removed, and the clay dug up one foot thick, or, if clay is not found on the spot, let it be carted in to that depth. Any ordinary clay will answer. Tread this clay over with cattle, and add some straw cut six or eight inches long. After the clay is well tempered with working it with cattle, the material is duly prepared for the making the brick. A mould is then formed of brick, of the size of the brick desired. In England they are usually made eighteen inches long, one foot wide, and nine inches thick. I have found the more convenient size to be one foot long, seven inches wide, and five inches thick. The mould should have a bottom. The clay is then placed in the moulds in the same manner that brick moulds are ordinarily filled. A wire, or piece of iron hoop, will answer very well for striking off the top. One man will mould about as fast as another can carry away, two moulds being used by him. The bricks are placed upon the level ground, where they are suffered to dry two days, turning them up edgewise the second day, and then packed in a pile, protected from the rain, and left to dry ten or twelve days, during which time the foundation of the building can be prepared. If a cellar is desired, this must be formed of stone or brick, one foot above the

surface of the ground. For cheap buildings on the prairie, wood sills, twelve or fourteen inches wide, may be laid on piles or stones. This will form a good superstructure. Where lime and small stones abonnd, grout made of those materials (lime and stones) will answer very well.

In all cases, however, before commencing the walls for the first story, it is very desirable, as well in this case as in walls of brick, *to lay a single course of slate;* this will intercept the dampness so often rising in the walls of brick houses. The wall is laid by placing the brick lengthwise, thus making the wall one foot thick. Ordinary clay, such as is used for clay mortar, will suffice, though a weak mortar of sand and lime, when these articles are cheap, is recommended, as affording a more adhesive material for the plaster. The wall may safely be carried up one story, or two or three stories; the division walls may be seven inches, just the width of the brick. The door and window frames being inserted as the wall proceeds, the building is soon raised. The roof may be shingles or thatch. In either case, *it should project over the sides of the house, and also over the ends, at least two feet, to guard the wall from vertical rains.* The exterior wall is plastered with good lime mortar, and then with a second coat pebble-dashed. The inside is plastered without dashing. The floors may be laid with oak boards, slit, five or six inches wide, and laid down without jointing or planing, if they are rubbed over with a rough stone after the rooms are finished. Doors of a cheap and neat appearance may be made by taking two single boards of the length or width of the doors; placing these vertically, they will fill the space. Put a wide batten on the bottom and a narrow one on the top, with strips on the side, and a strip in the middle. This door will be a batten door, but presenting two long panels on one side and a smooth surface on the other. If a porch or verandah is wanted, it may be roofed with boards laid with light joints, and covered with a thick paper dipped in tar, and then adding a good coat, after sprinkling it with sand from a sand box, or other dish with small holes.

Houses built in this way are dry, warm in winter, and cool in summer, and furnish no retreats for vermin. Such houses can be made by common laborers, if a little carpenter's work is excepted, in a very short time, with a small outlay for material, exclusive of floors, windows, doors, and roof.

The question will naturally arise, will the wall stand against the rain and frost? I answer they have stood well in Europe; and the Hon. Mr. Poinsett remarked to me that he had seen them in South America, after having been erected three hundred years. Whoever has noticed the rapid absorption of water by a brick that has been burnt, will not wonder why brick walls are damp. The burning makes the brick porous, while the unburt brick is less absorbent; but it is not proposed to present the unburnt brick to the weather. Whoever has erected a building with mercantile brick will at once perceive the large number of soft and yellow brick, partially burnt, that it contains—brick that would soon yield to the mouldering influence of frost and storms. Such brick are, however, placed within, beyond the reach of rain, and always kept dry. A good cabin is made by a single room twenty feet square. A better one is eighteen feet wide, and twenty four feet long, cutting off eight feet on one end for two small rooms, eight by nine each.

How easy could a settler erect such a cabin on the western prairie, where clay is usually found about fifteen inches below the surface, and where stone and lime are often both very cheap. The article of brick for chimneys is found to be quite an item of expense in wooden houses. In these mud houses no brick are needed, except for the top of the chimneys, the oven, and casing of the fireplace—though this last might be well dispensed with. A cement, to put around the chimneys, or to fill any other crack, is easily made by a mixture of one part of sand, two of ashes, and three of clay. This soon hardens, and will resist the weather. A little lard or oil may be added, to make the composition still harder.

Such a cottage will be as cheap as a log cabin, less expensive than pine buildings, and durable for centuries. I have tried the experiment in this city, by erecting a building eighteen by fifty four feet, two stories high, adopting the different suggestions now made. Although many doubted the success of the undertaking, all now admit it has been very successful, and presents a convenient and comfortable building, that appears well to public view, and offers a residence combining as many advantages as a stone, brick, or wood house presents.

I will add what Loudon says in his most excellent work, the Encyclopædia of Agriculture, pp. 74 and 75 :

"The great art in building an economical cottage is to employ the kind of materials and labor which are cheapest in the given locality. In almost every part of the world the cheapest article of which the walls can be made will be found to be the earth on which the cottage stands, and to make good walls from the earth is the principal art of the rustic or primitive builder. Soils, with reference to building, may be divided into two classes: clays, loams, and all such soils as can neither be called gravels nor sands, and sands and gravels. The former, whether they are stiff or free, rich or poor, mixed with stones or free from stones, may be formed into walls in one of these modes, viz.: in the pisé manner, by lumps moulded in boxes, and by compressed blocks. Sandy and gravelly soils may be always made into excellent walls, by forming a frame of boards, leaving a space between the boards of the intended thickness of the wall, and filling this with gravel mixed with lime mortar, or if this can not be got, with mortar made of clay and straw.

"In all cases, when walls, either of this class or the former, are built, the foundations should be of stone or brick, and they should be carried up at least a foot above the upper surface of the platform.

"We shall here commence by giving one of the simplest modes of construction, from a work of a very excellent and highly estimable individual, Mr. Denson of Waterbeach, Cambridgeshire, the author of the Peasant's Voice, who built his own cottage in the manner described below :

"'*Mode of building the mud walls of cottages in Cambridgeshire.*—After a laborer has dug a sufficient quantity of clay for his purpose, he works it up with straw ; he is then provided with a frame eighteen inches in length, six deep, and from nine to twelve inches in diameter. In this frame he forms his lumps, in the same manner that a brickmaker forms his bricks ; they are then packed up to dry by the weather ; that done, they are fit for the use, as a substitute for bricks. On laying the foundation of a cottage, a few layers of brick are necessary, to prevent the lumps from contracting a damp from the earth. The fireplace is lined and the oven is built with bricks. I have known cottagers, where they could get the grant of a piece

of ground to build on for themselves, erect a cottage of this description at a cost from £15 to £30. I examined one that was nearly completed, of a superior order; it contained two good lower rooms and a chamber, and was neatly thatched with straw. It is a warm, firm, and comfortable building, far superior to the one I live in; and my opinion is, that it will last for centuries. The lumps are laid with mortar, they are then plastered, and on the outside, once roughcast, which is done by throwing a mixture of water, lime, and small stones, against the walls, before the plaster is dry, which gives them a very handsome appearance. The cottage I examined cost £33, and took nearly one thousand lumps to complete it. A laborer will make that number in two days. The roofs of cottages of this description are precisely the same as when built with bricks or with a wooden frame. Cow-house sheds, garden walls, and partition fence, are formed with the same materials; but in all cases the tops are covered with straw, which the thatchers perform in a very neat manner.'—*Denson's Peasants' Voice*, p. 31."

No. 16.

Statement of duties now payable on imports by land or inland navigation, into the port of Saint John's, L. C., from the United States; also a statement of prohibited and free goods, March, 1842.

Articles prohibited.—Arms, ammunition, or utensils of war; gunpowder; blubber; base or counterfeit coin; books, first composed or written, or printed in the United Kingdom, and reprinted in any other, *imported for sale*, except books not reprinted in the United Kingdom within twenty years; fish oil; train oil; fish, dried or salted; fins or skins, the produce of creatures living in the sea; tea.

Articles free of duty.—Beef, fresh or salted; beans; peas; Indian corn; grain of all kinds; flour; fish, fresh; live stock of all kinds; garden seeds; potatoes; pork, fresh or salted; packages, containing merchandise subject to duty.

Articles subject to the duty of five per cent. sterling.—Ashes, pot or pearl; bread and biscuit; cotton; wool; diamonds; flax and tow; fruit and vegetables, green; hemp; hams and bacon; hay and straw; raw hides; drugs; meal; mutton, fresh; all fresh meat not herein declared to be free; rice, rosin, tallow, shingles, staves, veneers, and mahogany; wood and lumber of all descriptions; cassia; spirits turpentine; gum shellac; gum copal; varnish; palm oil; bitter almonds; gums; isinglass; chymical oils; red and white lead; sago; tamarinds.

Articles subject to the duty of seven and one half per cent., with addition of ten per cent. (ad valorem) to invoice.—Anchovies; alabaster; argol; aniseed; amber; almonds; brimstone; bartago; boxwood; currants; capers; cascuco; cummin seed; coral; cork; cinnabar; dates, every stone; fruits, preserved in sugar or brandy; figs; honey; iron, in bars, unwrought; pig iron; juniper berries; incense of frankincense; lava and Malta stone, for building; lentils; medals; marble, rough and worked; mosaic work; musk; macaroni; nuts of all kinds; ostrich feathers; oil of olives; oil of almonds; orris root; ochres; orange buds and peel;

olives; pitch; pickles; paintings; prints; pazzolana; pumice stone; punk; parmesan cheese; pearls; precious stones, except diamonds; quicksilver; raisins; sausages; sponge; tar; turpentine; vermilion, vermicelli; whetstones; gum; essences of bergamot, lemons, roses, citron, oranges, lavender, rosemary.

Articles subject to the duty of fifteen per cent. ad valorem.—All goods, wares, and merchandise, not otherwise specified in tariff, and not herein declared to be free of duty. We mention a few of the imports paying fifteen per cent. duty: combs; cheese; butter; lard; leather; allspice; pepper; ginger; pimento; hardware; castings; clay; earthen ware; wooden ware; chairs; furniture; beds; baskets; worsted and woollen manufactures; oysters; machinery; medicines; furs and skins; jewelry; cutlery; brooms; brushes; bristles; canary seed, &c.

Articles subject to the duty of twenty per cent. ad valorem.—Cotton, and cotton manufactures; glass, and glass manufactures; sugar candy; soap; cigars.

Articles subject to the duty of thirty per cent. ad valorem.—Books; paper, and paper manufactures; clocks and watches; leather manufactures; linen, and linen manufactures; musical instruments; wires of all sorts; silk, and silk manufactures.

Articles subject to different duties.—Salt, per 280 lbs., 2*s.* 6*d.* sterling; indigo, 6*d.* sterling per pound, or fifteen per cent.; tobacco, leaf, 1*d.* sterling per pound, or fifteen per cent.; tobacco, manufactured, 2*d.* sterling per pound, or twenty per cent.; snuff, 2*d.* sterling per pound, or twenty per cent.; sugar, refined, 2*d.* sterling per pound, or twenty per cent.; sugar, raw, 1*d.* sterling per pound, or 5*s.* sterling per cwt.; coffee, green, 2*d.* sterling per pound, and 5*s.* sterling per cwt.; coffee, ground, 4*d.* sterling per pound, and 5*s.* sterling per cwt.; coffee, roasted, 5*s.* sterling per cwt., and 5 per cent.; cocoa 5*s.* sterling per cwt., and 5 per cent.; molasses 1*d.* sterling per gallon, and 4*s.* 6*d.* sterling per cwt.; sirups 1*d.* sterling per gallon, and 1*s.* 6*d.* sterling per cwt., or 15 per cent.; Madeira, in casks, 1*s.* sterling per gallon, and £7 sterling per ton of 250 gallons. All other wines, except French, in wood, 6*d.* sterling per gallon, and £7 sterling per ton; wines, French, in wood, 6*d.* sterling per gallon, or 7½ per cent.; wines, in bottle, £7 7*s.* sterling per ton, and 7½ per cent., and 1*s.* sterling per dozen bottles; brandy, *Geneva*, cordials, or other spirits, except rum, not sweetened, and not exceeding the strength of proof by "Sykes's hydrometer," 1*s.* 9*d.* sterling per gallon, and so in proportion for any greater strength than the strength of proof; rum, sweetened, 2*s.* 7*d.* sterling per gallon; rum, not sweetened, and not exceeding the strength of proof by "Sykes's hydrometer," 1*s.* 6*d.* sterling per gallon, and so in proportion for any greater strength than the strength of proof.

Bonds are allowed on all provincial duties when amounting to £50 and upward, with conditions for payment at six months from the date of such bond, if the same shall be dated on or before the 1st day of September; and if dated after the 1st day of September, then it becomes due on the 1st day of April next ensuing.

Any information relating to the trade between the province and the United States, through this port, will be cheerfully supplied by addressing the undersigned.

JASON C. PIERCE & SON,
Forwarders and Commission Merchants, Steamboat and Custom-House Agents, Saint John's, L. C.

No. 17.

CUSTOMS, ST JOHN'S, L. C.,
December 28, 1842.

SIR: I have to acknowledge the receipt of your letter of the 23d instant, requesting I would reply to questions therein contained relative to what changes have taken place in our provincial duties on goods imported from the United States, on wheat, flour, beef, pork, lard, &c. In reply thereto, and to enable you to have a more correct knowledge of what the duties will be after the 5th of July next than I could give you in a letter, I now beg leave to enclose you a number of Neilson's Quebec Gazette, containing a summary of the trade act of the British possessions abroad, which goes into operations after that date. In the margin I have put down the additional duty imposed by our provincial statutes on many of the articles, viz:

On butter and cheese there is an additional duty of five per cent.
Coffee, two pence per pound, if green; roasted or burnt, five per cent.
Do. four do. do. if ground.
Cocoa, five per cent.
Molasses, 1*s.* 6*d.* per cwt.
Sugar, unrefined, one penny per pound; refined, two pence per pound.
Teas, three pence per pound.
Rum, six pence per gallon, hydrometer proof.
Other spirits and cordials, 1*s.* 7*d.* per gallon.
Salt, for every barrel of two hundred and eighty pounds, 2*s.* 6*d.*
On leaf tobacco, one penny per pound.
Manufactured tobacco, two pence per pound.
Madeira wine, one shilling per gallon.
Other wines, six pence per gallon.

All other articles charged with an ad valorem duty of fifteen per cent., seven per cent., and four per cent., an additional duty of five per cent.

In the table of exemptions, all the articles marked + are subject to a duty of five per cent. by provincial acts. The others not marked + are entirely free. In the last session of our provincial parliament, an act was passed imposing a duty of three shillings per quarter on wheat, which act has been reserved for her majesty's sanction; if sanctioned, it goes into operation on 5th July next. I can not state positively whether American produce, after payment of duty on importation in Canada, will be admitted into England as Canada produce. But, from the decision of the commissioners of the customs, lately given, that hams so admitted could be imported into Great Britain as Canada hams, I should conceive it would apply to all American produce. I am of the opinion the question will be finally settled in the next session of the imperial parliament.

At present, teas, oil, blubber, and skins, the produce of fish and creatures living in the sea, of foreign fishing, are prohibited, but will be admitted after the 5th July next.

The duties are all paid in sterling money, at the rate of 4*s.* 4*d.* to the dollar—equal to 5*s.* 1*d.* Canada currency, or nearly $1 02. The imperial duties are levied on the amount of invoice cost in the United States, and adding thereto ten per cent. For instance: should the amount of invoice be £100, the duty is charged on £110. The provincial duties are charged on the amount of the invoice, without the additional ten per cent.

It is supposed there will be some material changes at the next meeting of our provincial Legislature, in the tariff of duties imposed by them. There will, no doubt, be a reduction of the duty on tea, and an additional duty on some other articles; however, they can not reduce the duties imposed by the imperial parliament, though they have the power of adding to them.

The foregoing information and explanations will only apply to the trade of the two countries after the 5th of July next. Messrs. Jason C. Pierce & Son or Mr. Isaac Coote, forwarding merchants of this place, who have prepared a tariff of duties (for the information of their correspondents) now in force, would, no doubt, forward them to you, on application to them; or might obtain them from some of their friends in Burlington.

Any further information I could give you I would cheerfully do, and have the honor to be your very obedient servant,

W. MACRAE, *Collector.*

William P. Briggs, Esq.

Correspondence of the Journal of Commerce.

Liverpool, *September*, 1842.

Our new tariff being so favorable to the introduction of American provisions into England, that we have the prospect of an extensive and steady import of various articles of produce thence, we would throw out, for the guidance of those who contemplate engaging in the preparation of provisions for our market, some suggestions which we conceive to be important, and a compliance with which will operate favorably to the interests of those engaged in the trade. We are aware that the shipment of beef and pork to England this year has turned out a very unprofitable operation, and, in consequence, many persons feel discouraged from prosecuting the trade, having got the impression that a prejudice exists in this country against American provisions.

Such is not the case, however. It is true that those articles have been almost unsaleable in our market, but the reason is found in the fact of their entire want of adaptation to our tastes, and their general inferiority to what we have been in the habit of receiving from Ireland and Hamburg. Of this inferiority there is sufficient evidence in the fact, that while Irish pork has been selling freely at 70*s.* to 75*s.*, the American has been with difficulty disposed of at a price equal to 48*s.*, duty paid.

This inferiority, as regards pork, arises principally from the hogs being generally fed on beech nuts, or other wild feeding, which makes the meat soft and oily; but it is partly owing, also, to the hurried way in which provisions have been cured and packed (especially in the western country), and to the use of an inferior salt, quite unsuitable to the purpose. We would urge strongly on shippers the propriety of bestowing more care on the selection and preparation of pork for our market in future, as a soft and inferior article is almost unsaleable with us, and the shipment of such will be certainly productive of loss to the owner. These remarks apply with equal force to beef, which has been inferior, not only in consequence of insufficient fattening, but also from being very roughly handled. The form, too, in which both articles have been cut, has tended to occasion this depreciation in our market; and although it may not appear of sufficient consequence to

affect their value, yet, taking into consideration that our buyers have been accustomed to a certain cut for many years, it is reasonable that their tastes should be consulted. Of one thing we feel assured, that shippers will find it to their advantage to fall in with the requirements of our market.

We think it unnecessary to give in detail the process of curing followed in Ireland, as the difference in climate may require some peculiarity in the mode to be adopted in America, but we furnish the particulars which we consider most important. Bacon is made from pigs of any size, from 160 pounds up to the heaviest weights, and in the form either of long or short middles.

In making the former, the head and hams are cut off, the remaining bone is removed, taking as little of the lean meat off with the ribs as possible. The shoulder blade being taken out, the loose parts are cut off, so that no pocket is left to disfigure the bacon; the edges are squared and trimmed, all the soft and flabby fat being removed. Short middles are also free from bone, and differ from the other only in having the shoulders taken off. This cut, being most esteemed with us, always commands 2*s*. per cwt. advance on the price of long middles. Bacon is always cured in dry salt, and, when shipped to the English market, is packet with fresh salt, in Russia mats or coarse linen cloth, in bales weighing from three to four cwt. each. Boxes made to fit the size of the middles would suit equally well, if that mode of packing is found to be cheaper.

Hams are cut round and well trimmed, all the soft fat being taken off. They are cured in dry salt also, and, after being washed and well dried (without being smoked), are packed in hogsheads with the husks of oats, bran, cut straw, or any other dry material of like character, which will absorb the moisture produced by sweating. The shanks are cut off above the knee joint with a saw, and not with a cleaver, as practised now in America.

Mess pork is made from hogs weighing from 160 to 220 lbs., and is cut in pieces as nearly as possible of 4 lbs. each. The whole hog is used, with the exception of the head, feet, and legs to the knee joint. When packed for exportation, it is put in barrels containing fifty pieces, weighing 200 lbs., with St. Ubes or Turk's island salt, and in new pickle.

Mess beef is made from fat cattle only, and is cut in pieces of 8 lbs. each, the whole carcass, with the exception of the head, feet, and legs, being used. It is packed with St. Ubes or Turk's island salt, in a new pickle, in casks containing 38 pieces, weighing 300 lbs. The mode of curing both beef and pork, is to pack the pieces in dry salt, in large casks or vats, which are then filled up with pickle, having just so much saltpetre in it as will give the meat a color. At the end of 24 hours, or so soon as the salt and saltpetre have taken effect, and the blood remaining in the meat has been purged out, it is put in a new pickle, in which it remains until packed for exportation. The quality of the meat is injured by the use of saltpetre in any pickle after the first. The casks must be perfectly water-tight, and have two iron hoops on each end.

All pickle is made of such strength that an egg will float in it, and, after being allowed to settle, the scum is taken off the surface. Beef and pork have the name of the packer or shipper branded on the head of the cask, and below the name "38 pieces prime mess beef," or "50 pieces prime mess pork." Other qualities are put up in Ireland; but we consider the above to be the most deserving of the attention of American shippers.

It is not required that beef and pork should undergo a public inspection, as we consider that the best security of their marketable character is found in the obvious interest of packers to furnish such an article as will earn a good name for their brand, and obtain the highest current rates.

Fine leaf lard, if unmixed and well managed, will, we think, be a profitable article for shipment. It is put up in neat white kegs, containing about 40 lbs. each. The lard is poured into the kegs at the head, and, so soon as it has cooled and settled down, the surface is made level, and covered with white paper, which prevents it from adhering to the lid when opened for inspection in our market. It is also put up, to a considerable extent, in bladders, and shipped in hogsheads packed with bran or cut straw. It is important that the bladders should be well cleaned, by scraping and the use of acids, so that they may be tolerably transparent. The inferior lard may be put up in packages of any size, which, when large, should be iron-hooped.

We call the attention of curers in the United States to the fact, that while bacon and hams when dried pay a duty of 14*s.* per cwt., if shipped in pickle, they will be passed by our customs at the pork duty of 8*s.* As a set off, however, against the 6*s.* per cwt. saved in duty, it must be recollected that pork cured in pickle is inferior in quality to that cured in dry salt, and will not bring an equal price; that it is shipped in that form at an increased cost of packages and freight; and that it pays a duty on a greater weight than when dried. We give these considerations, that shippers may decide for themselves which is the preferable mode of shipment.

By the subjoined extract from the tariff, it will be seen that the different duties in favor of colonial produce are so great as to give a decided advantage to Canada in the shipment of all provisions for our home consumption. Thus, in beef and pork, while foreign is subject to a duty of 8*s.* per cwt., colonial is admitted at 2*s.*; but it is understood that, by the repeal of the 42d clause of the 3d and 4th William, cap. iv., 57, both foreign and colonial will now be admitted, for ship stores, free of duty. This feature in the bill we consider most important to America, and would call the attention of curers there to the altered position of the trade in that particular.

Lard is also admitted on favorable terms; and, as our demand for that article for machinery and manufacturing purposes is very large, we would strongly recommend that the soft pork should be melted down, and shipped in that form.

The high duty on foreign butter being retained, will prevent any regular trade in that article from America, except when prices are so low as to make it an object of attention for shipment of grease. Under this name, it is liable to a duty of 1*s.* and 8*d.* per cwt. only. In Canada, the soil appears to be very favorable for the production of this article; and, under the present modified colonial duty, it will become, we think, one of very large export. The principal fault in Canadian butter at present is, that the milk is not sufficiently pressed out, and. consequently, when shipped on a long voyage, it becomes rancid before it can be consumed. It should be packed in casks containing from seventy to eighty pounds, which must be air-tight.

Cheese has already been shipped extensively; and, as the quantity produced is increasing every year, it is likely to become an item of con-

siderable trade. This article has been shipped, heretofore, without much judgment being exercised in the selection or assortment of the qualities, which has prevented the returns being so satisfactory as they otherwise would have been. American cheese is, for the most part, insufficiently pressed, which gives it, when cut, a porous or honeycomb appearance. It is also unpleasant in flavor, owing to the too free use of rennet. The removal of these faults would very much enhance its value in the English market.

With respect to grain and flour, it will be understood that the new corn bill has placed the trade on a much more safe and steady footing; though there will always be uncertainty, while the principle of the sliding scale of duties is preserved.

On this branch of the trade no observations are required.

Beside those articles of produce mentioned, there are, no doubt, others deserving the attention of shippers; but we consider those specfied as having the most immediate importance.

The general directions now given being the result of our experience while engaged for some years exclusively in the produce trade, and being suggested by our personal inspection of provisions and of the modes of curing adopted in America, will be found, we conceive, not unimportant to those entering on the business.

We have expressed our belief that, under the existing tariff, a large trade in produce will arise; but when we look at the rapid progress of free trade principles in Britain, and the urgency of the popular demand for cheap provisions, we may safely predict a much more extended trade within a few years, in consequence of the still further modification of our provision laws.

JOHN & CHARLES KIRKPATRICK,
Produce Commission Merchants.

Present duties.

	Foreign.	Colonial.
Bacon, per cwt.	£0 14 0	£0 3 6
Beef, fresh or salted, per cwt.	0 8 0	0 2 0
Butter, per cwt.	1 0 0	0 5 0
Butter, as grease per cwt.	0 1 8	0 0 3
Cheese, per cwt.	0 10 6	0 2 6
Hams, per cwt.	0 14 0	0 3 5
Lard, per cwt.	0 2 0	0 0 6
Pork, per cwt.	0 8 0	0 2 0
Tongues, per cwt.	0 10 0	0 2 6

Five per cent. extra is payable on the amount of the above duties.

No 19.

WASHINGTON, *February* 6, 1843.

SIR: Agreeably to your request, I give a very brief description of the process used by the citizens of Vermont in the manufacture of sugar from the sap of the maple tree. The process, in the early settlement of the State, was very simple, being nothing more than evaporating the sap in iron kettles, usually about the capacity of ten gallons each, suspended over a fire made of logs, in the open air. When the sap is evaporated in the ratio of about ten or twelve gallons into one, the product is taken from the kettles, strained through a flannel bag, which takes from the sirup the leaves, coals, &c., which get into the kettles while over the fire. The sirup is then put into deep vessels, where it remains for two or three days to settle. The sirup is then carefully taken from the vessels, leaving the sediments, and returned to the kettles, with the addition of about a pint of skimmed milk to a kettle containing eight or nine gallons of sirup. It is then slowly heated, when most of the impurities remaining in the sirup will rise to the surface, and may be taken off with a skimmer. The sirup is then evaporated to the proper consistency, which is ascertained by cooling small quantities in a spoon, or in some small vessel. The product is then taken from the fire, and either stirred until it is cool, by which it becomes dry sugar, or, more commonly, it is put into a tub or trough, and left to cool, without stirring. This is afterward drained by drawing a plug from the bottom of the tub or trough, thus separating the molasses from the sugar.

In the early settlement of the State, and even at the present time, in new settlements, the above has been the usual mode of making sugar.

In the older settlements, buildings are erected within or near the sugar orchards. In these buildings large kettles are set in brick furnaces, for the purpose of evaporating the sap. In some of them, shallow pans, made of sheet iron, about six inches in depth, and of various dimensions, are also used. These pans are also set in brick furnaces, and are believed to evaporate much faster than deep kettles of the same capacity.

The common method of extracting the sap from the maple is, by boring into the tree about two inches, with a three-quarter-inch bit or auger. The sap is then conveyed into small tubs, holding three or four gallons each, called sap-buckets, by spiles slightly inserted into the tree. It takes about four gallons of sap to make one pound of sugar. The season for making sugar in Vermont commences between the middle of March and the first of April, as the spring is more or less forward, and lasts about three weeks. One hundred good trees will yield sap sufficient to make from three to five hundred weight of sugar.

Very respectfully, your obedient servant,

SAMUEL C. CRAFTS.

HENRY L. ELLSWORTH, Esq.,
Commissioner of Patents.

TABLE OF CONTENTS.